

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

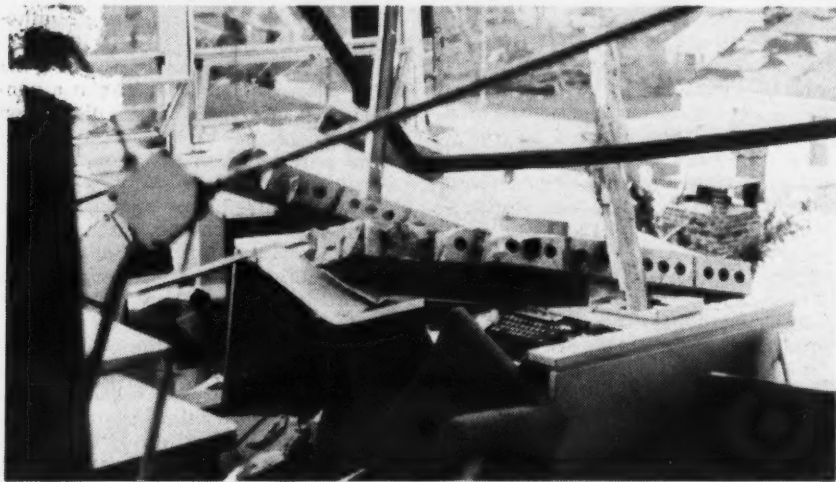
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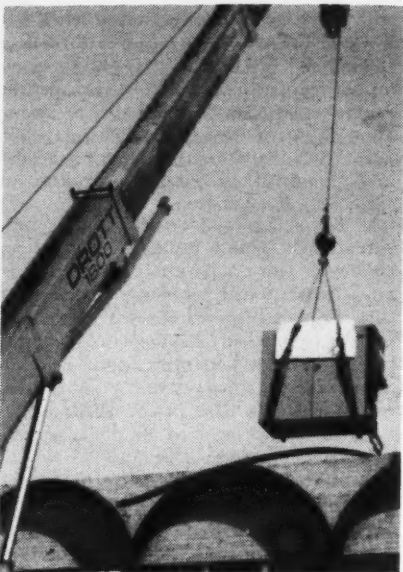
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Vol. IX, No. 24



In the aftermath of a tornado, Gate City Steel Co.'s data entry equipment looked like this.



An IBM 370/135 was removed by crane; the roof was removed by the tornado.

## Tornado-Torn System Back Up in 40 Hours

By Catherine Arnst  
Of the CW Staff

OMAHA, Neb. — When a tornado destroyed Gate City Steel Co.'s computer center here in 30 seconds last month, it took only 40 hours to get the system running again.

Gate City had a 10-minute warning that the twister was coming. Caught without an emergency plan, the company managed only to bring the system down and get all the employees into the basement to wait out the storm.

When it was over, the west wall, half of the south wall and the entire roof over the computer room had been ripped off. The system, built around an IBM 370/135, was covered with the fallen brick walls; there was considerable water damage, and debris and glass were strewn

(Continued on Page 4)

## Bell Asks FCC to Double DDS Rates in Seven Cities

By Ronald A. Frank  
Of the CW Staff

WASHINGTON, D.C. — AT&T has told the Federal Communications Commission (FCC) that it plans to almost double the rates charged for its Dataphone Digital Service (DDS) in seven cities beginning later this month.

The AT&T tariff proposal was expected and complies with an FCC order issued in December 1974. In that order the commission told Bell it would have to institute a two-tier pricing system for its DDS service. AT&T has now proposed the second group of higher rates in that two-tier scheme.

The net effect of the new rates will be almost a 100% increase in DDS rates in the seven cities slated to be added to the DDS network on June 27 if the FCC does not suspend the proposal. Even if the FCC approves the latest rates, these higher charges will expire on Dec. 15, according to the 1974 order.

At present, Bell customers are using DDS service in an initial five cities approved by the FCC in its order last year. These cities are Boston, New York, Philadelphia, Washington, D.C. and Chicago. Users in these cities are paying what AT&T has said is a fair rate for the DDS service.

The FCC disagreed, pointing out that existing private-line services covered under Tariff 260 and called the high/low density rates were about double what Bell wanted to charge in its first five DDS cities.

Citing the competition that existed between Bell and the newer specialized carriers, the FCC ordered AT&T last January

to go ahead with its low rates in the first five cities, but it also ordered rates for 19 additional DDS cities to be comparable to the Tariff 260 rates.

The FCC order stipulated that Bell had to file its new rates no lower than existing Tariff 260 charges for private-line service. In response, AT&T has kept its new proposed rates equal to the rates that were in effect last December.

### Tariff Hiked 5.1%

In March, however, the Tariff 260 rates went up 5.1%, and the proposed charges filed for the seven cities are therefore less than current rates now in effect. It remains to be seen whether the FCC will allow these rates to take effect on June 27.

The latest AT&T filing would initiate DDS service to the first seven of the 19 cities where the FCC ordered higher rates. These are Baltimore, Cleveland, Detroit, Kansas City, Mo., Newark, N.J., Pittsburgh and St. Louis.

It is expected that users with requirements to transmit data between any of the lower-priced five cities and any of the new seven cities will have to pay the higher rates. Service in all 12 cities will be available at 2,400-, 4,800- and 9,600 bit/sec and 56 kbit/sec for both point-to-point and multipoint users.

A monthly DDS charge is made up of three components. The first is an inter-city mileage rate which goes up as the transmission speed increases. The user also pays a service terminal charge for each end of the channel, which also varies with the transmission speed, and a charge for a DDS network interface unit called a Data Service Unit (DSU).

In addition, there are two types of Data Access Lines (DAL) to get a user from his site to the nearest DDS terminal.

Because of the various charges included in a user's monthly DDS bill, exact costs are often based on interpretation of the tariff. A comparison of DDS rates now in effect with the proposed charges showed the rates have increased by about 95% to 97%.

Using figures compiled by AT&T Long Lines, end-to-end service between Kansas

(Continued on Page 5)

## Defense Department Official Says

## Army Files on Citizens Still Not Destroyed

By Nancy French  
Of the CW Staff

WASHINGTON, D.C. — A Defense Department official testified last week that 10,000 dossiers on American citizens may still be in government computers and possibly even in the hands of university contractors — four years after they were ordered destroyed.

Deputy Assistant Secretary of Defense David O. Cooke also told the House Government Information and Individual Rights Subcommittee a computerized index containing 15 million names is housed at Ft. Holabird, Md.

Although he denied a report broadcast by NBC's Ford Rowan that the records were secretly transferred to the Central Intelligence Agency (CIA), the National Security Agency and the Massachusetts Institute of Technology (MIT), sources in the Boston area confirmed the files were indeed transmitted to MIT in January 1972 over the Defense Department's Advanced Research Projects Agency (Arpa) network.

"Files were transmitted over the Arpa net to certain parties on a joint MIT-Harvard project who were writing data bank maintenance programs for use on Army

surveillance files on civilian antiwar protestors," a source said.

At the time of transmission, one source said, an Army lieutenant colonel told him the records were coming from the National Security Agency at Ft. Mead and had been copied from files kept at Ft. Holabird.

At the time this was going on, the Army was making a big flourish about destroying these very files, he said.

Cooke told the House subcommittee that, "to the best of my knowledge," no evidence supported the allegation, although he later corrected himself by saying no material had been sent to the National Security Agency since the 1971 directive was issued.

In addition, Pentagon witnesses at the hearing said at least two dozen civilian federal agencies as diverse as the Agriculture Department, FBI, CIA and Library of Congress have access to the contents of the huge index, called the Defense Central Index of Investigation.

Cooke, who is chairman of the Defense Privacy Board, said the retention of the 10,000 microfilm documents on antiwar activities of American civilians found in the army's counterintelligence analysis

detachment offices in Washington was the result of a "goof."

The persons responsible either ignored or were unfamiliar with the Pentagon's 1971 directive that the files be destroyed [CW, Feb. 19], he said.

## Boyd Named to CW Presidency

NEWTON, Mass. — W. Walter Boyd has been named president and chief operating officer of Computerworld, Inc., publisher of the news weekly *Computerworld* and producer of the Computer Caravan trade shows, it was announced by Patrick J. McGovern, Computerworld's board chairman and chief executive officer.

Prior to his appointment, Boyd was executive vice-president of Computerworld, Inc. McGovern previously served as both president and board chairman of the company.

In making the announcement, McGovern noted that "during the past two years, Boyd has shared with me top management activities, and during that time he has been largely responsible for the development of the company's operating plans, managing their implementation and

directing the day-by-day affairs of the business.

"His effectiveness in this post has been fully confirmed by the excellent results

(Continued on Page 5)



CW Photo by A. Dooley  
W. Walter Boyd





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## For Noncrime Inquiries

## Justice Limits Arrest Data Dissemination

By Nancy French  
Of the CW Staff

WASHINGTON, D.C. — The Justice Department has issued privacy regulations which, for the first time, contain a rule barring dissemination of arrest records without dispositions for noncriminal justice purposes.

The rule, which prohibits sharing sensitive criminal history information with other federal agencies as well as state, local and private-sector organizations, is part of a set of comprehensive regulations that become effective June 19.

The regulations apply not only to federally funded state and local criminal justice agencies, but also to the Federal Bureau of Investigation's National Crime Information Center Computerized Criminal History (NCIC/CCH) system.

The regulations were signed by Attorney General Edward H. Levi and the administrator of the Law Enforcement Assistance Administration (LEAA), Richard W. Velde, and were published in the *Federal Register*.

Under the regulations, each state must submit to LEAA operating procedures to meet these requirements by Nov. 19, and LEAA has promised approval or disapproval of each state plan by Feb. 19, 1976.

The rules do not affect the current practice of disseminating outdated arrest records without dispositions for law en-

forcement purposes, an FBI spokesman said.

Under the regulations, states must develop procedures to ensure arrest records are updated with dispositions within 90 days after the disposition has occurred.

Procedures also must be adopted to ensure that, before any criminal history information is disseminated, the criminal justice agency in question queries the central repository to ensure the most up-to-date disposition data is being used.

Agencies will be required to institute data collection, entry, storage and systematic audit procedures to minimize the possibility of recording and storing inaccurate information. They also will be required to notify all criminal justice agencies known to have received such information.

Dissemination of criminal history information will be limited to:

- Criminal justice agencies for administrative purposes and agency employment.

- Other individuals and agencies that require such information to implement a statute or executive order.

- Individuals and agencies that provide services required for the administration of criminal justice.

- Individuals and agencies needing the information for research, evaluation or statistical purposes in accordance with an agreement with a criminal justice agency as long as the agreement specifies and

ensures confidentiality and security of the data consistent with these regulations.

- State or federal agencies authorized by statute or executive order to conduct investigations to determine employment suitability or eligibility for security clearances.

- Individuals and agencies where authorized by court order.

The regulations forbid disseminating the arrest record of an individual to a non-criminal justice agency if no disposition of the charge has been recorded and no active prosecution of the charge is pending after one year.

To assure security of criminal history information, every agency that uses computerized systems for collecting, storing or disseminating such data will be required to employ software and hardware to prevent unauthorized access.

Under the new rules, the hardware, including CPU, communications control and storage devices used to handle criminal history record information, must be dedicated to purposes related to administration of criminal justice.

In addition, each agency must have authority to set and enforce policy concerning computer operations as well as control and select the personnel permitted to work in the area where such information is handled.

The regulations require that agencies ensure that an individual or agency granted direct access is held responsible administratively for the physical security and privacy of the criminal history record information it receives.

As for access and review by the individual upon whom information has been collected, the regulations require that he be permitted to review any criminal history information maintained about him for the purpose of challenge or correction upon satisfactory identification.

Correctness, accuracy and completeness of information held in the FBI's NCIC/CCH will continue to be the responsibility of the contributing agency.

Under the regulations, individuals wishing access to these records may, after verifying identity through fingerprint comparison and payment of a processing fee, gain access to such files.

Any discrepancies must be appealed to the contributing agency. If and when the contributing agency corrects the record and notifies the FBI, the record will be changed, according to the regulations.

Any agency or individual who violates any part of the regulations is subject to a fine of up to \$10,000 and a loss of federal funds.

## Telex Asks High Court to Review Decision in IBM Antitrust Case

WASHINGTON, D.C. — As expected, Telex Corp. last week filed an appeal of its antitrust case against IBM with the Supreme Court.

In the appeal, Telex argued that the 10th Circuit Court of Appeals erred when it overturned the Federal District Court decision against IBM because it failed to properly define the market for peripheral equipment and because it misinterpreted the law.

The relevant market should be determined from the standpoint of the buyer or consumer of a product and not from the view of the industry, Telex's brief claimed.

Therefore, if users do not see products as interchangeable — as is the case with non-IBM peripherals — then the mere fact that another manufacturer might make compatible equipment should not be con-

sidered, according to the brief.

Secondly, if the appeals court determination of the market — that is the market for all peripheral equipment — is true, then it should have found that IBM monopolized the entire market for peripherals, according to the brief.

In addition, the brief charged IBM did not maintain its monopoly position by legitimate means, as the appeals court found, but acted instead with the "deliberate purpose of destroying present competition and forestalling potential competition in order to maintain its monopoly."

It did this by cutting prices to a level where competitors could not survive and by tying up the market with long-term leases in the areas where it had competition while, at the same time, raising rates where there was no competition.

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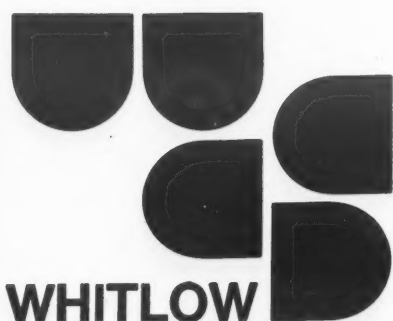
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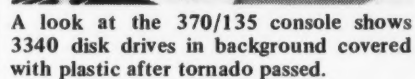
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Another view of 3742 data entry terminal shows it covered with pieces of brick walls torn from building.

Because Gate City had no plan of action for such a disaster, Isgrig admitted everything was "very spur-of-the-moment." However, he said a plan is now being developed.




The story showed simulation can be the only answer for many performance problems – particularly complex problems – in the life cycle of a computer system.

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52 Other Sales/Marketing  
60 Consultant  
70 Lawyer/Accountant  
80 Librarian/Educator/Student  
90 Other:



## Doubled Rates Asked For Seven DDS Cities

(Continued from Page 1)

City and Boston will cost \$1,289.10/mo for a user transmitting data at 2,400 bit/sec. The earlier five-city rate for the same distance is \$678.40. A user with existing high/low density private line rates would pay \$1,350.74 including Bell data sets.

An AT&T spokesman pointed out DDS and the high/low density private-line rates "are not comparable because we feel DDS is really a unique and distinct offering that is different from any analog service now being used for data."

In its proposed seven-city rates, AT&T raised the monthly cost of a DSU (required at each end of a line) from the five-city rate of \$15/mo to \$55/mo for service at 2,400-, 4,800- and 9,600 bit/sec. The DSU charge at 56 kbit/sec remained the same at \$20/mo. The one-time installation cost for all DSUs, at \$25, also stayed the same.

Charges for DALs did not change. There are two types depending on how far a customer site is from a DDS terminal office. Type I, which includes phone exchanges up to about five miles from the DDS office, costs \$65/mo at 2,400 bit/sec, \$85/mo at 4,800 bit/sec, \$110/mo at 9,600 bit/sec and \$200/mo at 56 kbit/sec.

Type II DAL lines cost more per month and also add a mileage charge. The Type II rates are \$90/mo plus 60 cent/mile at 2,400 bit/sec; \$110/mo plus 90 cent/mile at 4,800 bit/sec; \$130/mo plus \$1.30/mile at 9,600 bit/sec; and \$250/mo plus \$6/mile at 56 kbit/sec.

## Boyd Named to Head Computerworld, Inc.

(Continued from Page 1)

achieved by Computerworld, Inc. during that time. Therefore, I am pleased Boyd has been elected to the post of president to formalize the description of the responsibilities which he has conducted during the past two years."

Boyd first joined Computerworld in 1968 as managing editor, with responsibility for organizing and supervising the production of *Computerworld*. He was also in charge of circulation promotion. Subsequently he became publication manager and, in 1971, was appointed executive vice-president.

A native of Chicago, Boyd is a graduate of the University of Chicago. Before joining Computerworld, he was managing editor of *Trans-Action*, a monthly magazine of the social sciences.

He has also worked for radio station WFMT in Chicago as managing editor of its publication, *Chicago Perspective*, and is the author of a book on the cultural and educational aspects of Chicago.

Boyd resides in Boston and maintains a summer residence in Gloucester, Mass.



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## Say Proving 'Intent to Monopolize' Not Enough

# IBM Lawyers Ask Edelstein to Dismiss Antitrust Case

By Edith Holmes  
Of the CW Staff

NEW YORK — As the government was completing its opening statement in its massive antitrust suit against IBM, Lawyers for that corporation were submitting a request to Judge David N. Edelstein that he dismiss the case or, as an alternative, render a summary judgment.

IBM claimed that, to be within the law, the government must prove the corporation willfully acquired and maintained monopoly power "through conduct which is not normal competitive behavior but which is predatory or exclusionary."

But, IBM's legal counsel said, the Justice Department thinks it can prove violation of the antitrust laws by proving "intent to monopolize" alone, irrespective of the corporation's conduct in the marketplace.

"Because plaintiff's opening statement

fails to state exclusionary conduct constituting the willful acquisition or maintenance of monopoly power, it fails to state a prima facie case. It should therefore be dismissed.

"It makes no sense to conduct a year-long trial on the basis of so plainly erroneous a notion of the law. It will result only in reversible error and the most extravagant waste of judicial resources in the history of the federal court system," IBM attorneys said.

They added that only the Supreme Court can decide the issue the government is really bringing to bear in this case: that the antitrust laws "should be extended to condemn bigness as badness."

And the government should address its "revolutionary claims" to that tribunal "before — not after — a year-long trial

based on a misconception of the antitrust laws as they now stand," IBM's lawyers contended.

The government answered these charges in a memo of its own to the court. Maintaining that IBM's argument misstated the Justice Department case, the lawyers representing the government said they never intended to show specific IBM practices — in particular bundling, educational allowances and fighting machines — constitute by themselves violations of Section 2 of the Sherman Antitrust Act.

Rather, they said, the government plans to prove IBM furthered its monopoly of the market for general-purpose electronic digital computer systems by engaging in such practices to exclude competition from the marketplace.

"The case of monopoly here does not rest on the illegality of a particular act or acts... It is a well-recognized principle of antitrust law that certain conduct, whether lawful by itself or not, may in concert with other acts or conduct and/or indicia of market power, constitute violations of the antitrust laws."

Section 2 requires only that general intent to monopolize be shown, they continued in their memo, adding IBM internal documents will show specific in addition to general intent.

Finally, the government said, the relevant case law in those suits similar to and therefore providing the precedent for the course taken in U.S. vs. IBM indicate the summary judgment rule is inapplicable to "a large, complex antitrust case involving a substantial industry."

## Trial's Second Week Focuses on Industry

NEW YORK — The witnesses called by the government in the second week of trial of its antitrust suit against IBM continued to provide the court with background on the history and nature of the computer industry.

Much of the week was spent with the testimony of Jay P. Eckert, technical advisor to the president of Sperry Rand Corp. and a vice-president of the firm.

Eckert testified specifically on the nature of compatibility and competition in the computer industry from Univac's viewpoint as he has seen it.

He said two devices could be judged "compatible" when they can both be operated from the same set of instructions, the same software.

Univac's greatest problem in selling computers competitively is that it cannot take over the software of an existing installation — particularly an IBM installation — easily, Eckert testified.

He told Raymond Carlson, lead attorney for the government, that Univac must put extensive and therefore expensive effort into reconstructing IBM software to run on its machines, and this problem of compatibility keeps the company from being competitive.

Over the past 10 years, Univac has considered its basic business to be constructing, selling, installing and maintaining general-purpose systems, Eckert said. He indicated Univac's competitors in this effort have been IBM, Honeywell, NCR, Control Data Corp., Xerox and Burroughs. When reminded of RCA and GE, Eckert included these as well.

He also said he was aware NCR and the others he named as competitors did in fact compete with Univac because sales people in the organization told him of instances of lost bids.

Asked whether Univac machines could run on Burroughs, Honeywell, Texas Instruments or Hewlett-Packard software, Eckert replied he didn't know of any that could. If Univac machines could run on IBM software, Eckert said he believed Univac could increase its market share.

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# Study Stresses Economy of In-House Training Programs

By Edith Holmes  
Of the CW Staff

PHILADELPHIA — No one "right" way exists to handle the training needs of an organization, according to a recently published Auerbach study on the development of in-house DP training.

But, the study noted, "of all sources of training, in-house programs are the most economical, therefore the most cost-effective, methods of providing training under a variety [of] circumstances."

Where study indicates in-house programs will be the most economical and beneficial means of acquiring the expertise needed by a particular organization, the Auerbach report suggested these programs be carefully developed and controlled.

In selecting an approach to training, those advocating it must pay attention to the needs of their organization's managerial and technical staffs, its size and

industry, its financial resources and its philosophical view of education and training, the study said.

Auerbach noted the decision to buy rather than develop a training program stems from assumptions that it will be less expensive in the long run and easier and better for the organization because outsiders will provide new blood, and, hopefully, new ideas.

But the report warned that an organization which goes outside runs the risks of demoralizing its existing staff, placing extensive responsibility with "unproven" people (thus increasing the need for management attention), spending time and money in recruitment and acquiring expertise in such small quantities that it may be of limited value.

Expertise in managerial and technical areas can be obtained by using in-house programs to locate, train, develop and monitor existing human resources within

the organization, the study argued. "Such programs can also save money by training inexpensive recruits rather than hiring

## Professional Development

them already trained."

The chief sources of outside training are college programs, association-sponsored training and for-profit seminar companies and training organizations, according to Auerbach. This variety of suppliers can be melded with various inside training approaches — including consultants, vendors of packaged training and internally developed programs — to come up with the kind of DP instruction an organization needs, the study said.

Auerbach stressed that those interested in initiating a training program in their firm begin with a written proposal that sells the approach both quantitatively and qualitatively. Training proposals should include a financial analysis, an implementation plan, key result areas and methods of benchmarking and controlling those results, the report added.

Any decision to invest in training "should be made on a business basis," Auerbach said, and should involve calculations of the costs of each alternative and a comparison of costs and returns.

"Justify the investment in training over any alternative investment by showing that the monthly (or annual) return to the organization would at least equal that available from any other source," the report advised. "The proposed alternative should be the best all-around choice."

### Match Company's Needs

The topics selected to make up the program "should fit the needs of the organization and not the needs of the DP industry," the study continued. It suggested "the best sources of topics for realistic in-house training programs are the line and staff managers who live with the problems training is supposed to solve."

In defining the scope of a training program, Auerbach warned that "the more dependent [a company is] on outside sources, the more expensive it becomes to train people... It is extremely desirable to do as much of the developmental work as possible in-house."

Outside sources such as college syllabi and curricula can be used as models, however, the report added. Topics contained in current literature on a subject should be considered, in addition to target trainee and corporate preferences.

Auerbach cautioned against the using of too much "electronic gadgetry" in training courses. Audiovisual aids "should be considered secondary to the teacher-student interface under all circumstances."

"There is no substitute for good instructors, and all the electronics and fancy displays in the world will not compensate for poor teaching skills," the study said.

While matters such as course duration and depth of detail should be judgments made by the instructor, an overall training manager should be able to recommend materials and aids to the instructor in addition to obtaining them for him. It is also within the manager's province to comment on the methods used by the instructor to present materials to a class.

Though senior staff members are often used as teachers, they frequently do not make the best instructors, Auerbach commented. The two major criteria for selecting instructors should be expertise first and teaching ability second, the report noted.

The research firm emphasized the importance of getting people to sign up for the courses in any new in-house training program. Among the several techniques for marketing the training program are linking promotion to participation in "professionalization programs" for technical staff members, using aptitude tests to attract attention to the program and stimulate interest in it.

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## Editorials

### Look Over Your Shoulders

AT&T has formed a Large Users Action Council to expedite problem solving for its largest customers. The announcement of this new way to hold the hand of Bell's biggest accounts was made by AT&T board chairman John deButts at the annual conference of the International Communications Association (ICA) [CW, May 21].

It is fitting deButts announced another way to favor Bell's largest customers at a conference of users who are among the very largest Bell serves. In fact, one of the qualifications for ICA membership is that the user must have an annual phone bill of \$1 million.

There are those that will argue the largest users also deserve the highest level of attention from any vendor. Perhaps that is true, but it gives little consolation to the smaller user. When deButts was asked how Bell plans to solve the problems of its smaller customers, the AT&T chief replied that the little guys would be expected to go through normal channels.

This favored treatment of large customers is certainly not limited to Bell. Increasingly in our industry the small user has had to be more independent.

AT&T and ICA and all the others that want to keep their tightly knit groups based on sophisticated size are overlooking a fundamental axiom: The large user of today was once a small user. Someone had to give him help and advice and hold his hand while he grew.

Today, more entry-level users are entering the world of computers and communications than ever before. There are some user groups for these small systems customers, but overall there is not enough attention being paid to entry-level problems by both vendors and larger users.

Don't be afraid to look over your shoulders, gentlemen, because the small user has the capability to outnumber his older, larger comrades once he puts his mind to it.

### Hearing Needed

Telex has filed a request with the Supreme Court asking for a hearing on the U.S. Court of Appeals' decision of its antitrust suit against IBM.

The Supreme Court should take up the appeal because it raises significant questions for both computer users and the computer industry. Those questions need to be settled now.

Two courts have already heard the Telex case and they came to dramatically different conclusions about the nature of the data processing industry and the application of the antitrust laws. Only a Supreme Court decision can clear the record once and for all.

The court should hear this case now and not wait until the infinitely more complex antitrust action by the U.S. Government against IBM reaches it.



*'And Each and the Several of Us Do Hereby Agree and Swear Together, That We Shall Maintain at All Times and at the Ready, Suitable Replacements, in Order That This Trial Shall Continue to Perpetuity, and Forever and Ever ...'*

## Letters to the Editor

### Controllers' Choice of RDP System Best Endorsement of Its Reliability

The charges made by John B. Galipault about the Federal Aviation Administration's (FAA) radar data processing (RDP) system ["Critic Says FAA Control System Has Bugs," CW, May 7] were unfounded and grossly misleading.

The RDP system is not being rushed into service. On the contrary, it was extensively tested before being put into operation at the first two sites in March of 1974.

And, as the job of installing it at other facilities went forward, it was thoroughly tested and the controllers thoroughly familiarized with it at each site before it was put into operational use.

As with any new and advanced electronic system, there were some minor problems, but these were resolved before the system was put into operational use. And on no occasion — from the time it first went into operational use to today, when it is in operation at 17 of the FAA's Air Route Traffic Control Centers — has FAA had any reports of hazardous conditions or near-misses attributable to malfunction or inadequacy of the RDP.

The FAA remains confident that the RDP is a safe and reliable system, and the best evidence of this comes from the controllers themselves.

They have the choice of using the RDP system or the Broadband system. And virtually without exception they are using the RDP. I don't believe that you can get a stronger endorsement than that.

William M. Flener  
Associate Administrator,  
Air Traffic and Airway Facilities

Federal Aviation Administration  
Department of Transportation  
Washington, D.C.

### Smelling Out Federal Reality

In reference to Herb Grosch's May 21 column, here is one "innocent onlooker" who cannot smell corruption in one National Bureau of Standards' proposal to the General Services Administration (GSA) for a Cobol validation technique. Perhaps Grosch's sense of smell has obstructed his ability to perceive the true scent of federal Cobol reality.

The goal of the GSA procurement policy is to provide products and services to its agency users in the most beneficial (i.e., economic) manner for the Federal Government. And if this is best served by allowing individual agencies to use only those standard features they actually need, then so be it.

I think that federal agencies using Cobol are no different from those of us in the private sector. Our data looks the same and our use of the language is just as limited.

It is time to free our federal friends from having their technical futures dictated by a procurement policy. A Cobol compiler with only one verb, as long as it is implemented according to the standard, is just as standard as a full ANS Cobol compiler with one nonstandard extension.

If an installation can justify using a smaller standard subset, it should be allowed to do so. The justification may be a little hairy, but this is one way new standards are created.

And who says languages have got to get bigger?  
Howard Bromberg  
San Francisco, Calif.

### Corrections and Questions

In J. Daniel Couger's May 21 column, many of the points he made were quite valid, but there were errors of fact which should be corrected.

Couger stated that Control Data Corp. produces a course in IMS. In fact, only part of the course is currently available. He also said Edutronics will release its IMS course this summer; the entire course has been available since early February.

Secondly, Couger stated: "In earlier years, the A/V producers emphasized sale of complete courses ... Earnings are now at the level to permit these companies to rent materials ..."

In fact, Edutronics has been offering rental plans since 1969, and the other vendors have been forced to follow Edutronics' lead in order to keep a share of the market, not because their earning levels "permit" such plans.

Finally, I must ask what basis Couger had for his statement that the greatest need right now is for intermediate and advanced levels of data communications training. He doesn't explain his reasoning, nor does he indicate that any study of the expressed needs of the DP community underlies his statement.

Donald L. Sullivan  
Vice-President

AV Products, Inc.  
Wakefield, Mass.

### Address Space Not Long Enough

Does Alan Taylor read his own articles? In the "Taylor Report" of May 28, he discussed the limitations of two-line, 20 char./line fields for people's addresses.

At the end of the article was a reader questionnaire. The space on the form for the address is only one line long and 31 typed characters wide.

Los Angeles, Calif.  
James Gips

(Other letters on Page 10.)



## Changing Sincerities

Usually I don't have much of a problem in separating two of my major roles: society officer and columnist. As I've written before, I'm not really a journalist, and I don't feel any great compulsion to report everything around me that bears on computers. The other officers of the Association for Computing Machinery (ACM) look at me nervously on occasion, fearful that I may dump ACM business on the market in advance of the proper moment, and society members are sometimes disappointed that I don't use this column to promote ACM activities more.

I apply a simple touchstone in the occasional marginal situation: Would I have known about the subject matter, and could I have had a letter to *Computerworld* published about it, if I had not been an insider? That goes for lots of other activities I'm in as a senior member of the trade: the Massachusetts Security and Privacy Council, for example.

So I feel free to describe a messy action of the ACM Council in Anaheim. The meeting was officially open to all members and, in practice, to anyone who walked in. And I would have been just as angry and just as inclined to write in expostulation if I had been only an outsider.

The ugliness began with a resolution concerning sponsorship of international conferences,

which endorsed the position of the International Council of Scientific Unions on the free circulation of scientists. The idea is to make sure that out-of-favor Russians can get to meetings and Cubans get to the ACM. The crucial sentence read, "...the ACM or any of its subunits shall not enter formal agreements on international conference sponsorship or participation unless the sponsoring organization in the host country has agreed to adhere to these principles." There was some reluctance to adopt the motion, partly due to the U.S. not having clean hands in the matter, but in the end the resolution was passed by about an 80% vote.

It was agreed by a much closer vote to communicate this action to the State Department, hoping to improve the visa situation for foreign attendees in general and for Cubans and North Koreans and such in particular. No surprises, really: honest-to-God action is always less popular than paper tigering.

Ah, but then came the hooker! How about the ACM special interest group on artificial intelligence acting as a disbursing agency for National Science Foundation (NSF) travel funds for U.S. academics to go to a meeting in Russia where there is clear evidence of restriction on attendance? A supporting vote meant that the voter *himself*, or one of his buddies,

might have a little more difficulty siphoning off public money from NSF. Another mechanism would be set up, of course, if ACM backed away — but delay and decreased intimacy would slightly constrict the siphon.

Would you believe it? Opposed, 90%! Sure, help the Russian Jewish mathematicians and computerniks, and the Cubans and the anarchists, on paper. But not if it even slightly hampers access to the goodie bag! How shameful, how venal can you get?

And my screams of anguish were brushed aside. Bernard had it right, you know: "Men are always sincere. They change sincerities, that's all."



Herb Groch

## Data Base Quality Control Installed Easily, Quickly

Quality control has some design problems because it cannot, by its nature, ever be complete.

A designer can finish the design of a retrieval method simply by getting a system designed to retrieve records on demand. He can finish the design of a report or of an update.

But the design of a quality control system for the data base itself simply can never be completed.

However, while this can be discouraging, the fact is that some of the greatest gains in data quality control come quickly and simply. Items that check for negative numbers where positive numbers are the only ones that normally occur, for instance and items that check for identity where identity is unlikely in real-world operations are both simple and quick to install.

Set your targets too high in data quality control, and you will get nowhere slowly. But if you set them realistically and do some planning, you will be surprised how quickly the system becomes productive.

### Two Methods

There are two basic methods of providing data quality control. These are the after-the-fact and the before-the-fact methods.

An After-the-Fact quality control system reviews from time to time (generally in off-hours) the contents of each of the data base records on a record-by-record basis.

After the review is completed, the record is either approved, condemned or questioned to some extent. In addition, the date of the review is noted.

These requirements of recording the result of the periodic reviews constitute the only real planning for after-the-fact quality control protection for your data files that is necessary. Fields have to be added to each record to hold this information. Generally, a six-digit field subdivided into three fields is enough (Figure 1).

After-the-fact quality control is particularly appropriate for records with a high proportion of balance information, as opposed to records mainly composed of

simple update information. Balance data is, by its nature, not included directly in updates, and introducing the update into the balance quality-control procedure adds unnecessary complications to the picture.

Programming for this type of operation is one of the simplest tasks. Provided the six-digit quality control field was incorporated into the system when the record designs were established. Quality control programming does not interface with any of the system programming. In fact, it does not need to be programmed until the system goes on the air.

Before-the-Fact data quality control is only slightly more complicated. Unlike after-the-fact controls, it cannot be programmed as a completely separate run, but it can be a separate routine, which is almost as good.

In the before-the-fact situation, the quality control tests take place after the update activity and the appropriate master file record have both been identified, but before any update action has taken place. Here the task is to check whether anything other than format problems should stop or delay the updating process.

Planning factors come in when designing what action should be taken in either case. Unlike the after-the-fact data quality control where all that has to be recorded is what has failed to operate on a single field, the before-the-fact data quality control has normally to identify two fields which are in apparent contradiction — one in the update and one in the main record.

In addition, before-the-fact data control has to record what action was taken (whether the update was accepted) and, because of the frequency of updates it has to record, the identity of the update concerned.

All of which takes room and more than the six digits required for the after-the-fact data quality control. How much room is a question for each system, but basically around 20 digits is normally sufficient. These digit requirements are:

- Action code — one digit.
- Field 1 identification — two digits.
- Field 2 identification — two digits.
- Test Number — two digits.
- Test result — two digits.
- Update identification number —

about six digits.

- Update attempt date — three to six digits.

As is the case with after-the-fact data quality control, the actual programming of the tests, etc., can wait until the system is ready to go on the air.

In fact, such testing can be incorporated into an already-running system quite easily and quickly, and by a different programmer without any great complications.

Indeed, this characteristic of both the data quality control methods is necessary so additional tests can be added as need-

ed, tests moved from before-the-fact routines to after-the-fact programs where appropriate, etc.

With these two data quality control methods available, a programmer can provide some of the best data quality control available — and do it practically in no time at all.

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### After-the-Fact Field Requirements

- 2 digit questionable field number
- 3-digit test result number
- 1-digit data quality control run
- 6 digit total

The after-the-fact data quality control routines typically require the use of around six digits in the record file itself. A normal breakdown provides for the identification of only a single field, even though it may be the relationship between two fields that raises the questions as to the problems.

Equally, instead of providing separate fields for the test number and the test result, a three-digit field is used for test results, which is the key item upon which action is to be taken.

A single-digit data quality control run used cyclically completes the system. This is particularly suitable for records containing the results of computations as well as data updates.

Figure 1 — Typical Breakdown of After-the-Fact Field Requirements

### Before-the-Fact Field Requirements

- 1-digit action code — record file
- 1-digit action code — update attempt report
- 4-digit field identification in update and data base records
- 2-digit test number
- 2-digit test result
- 6-digit update identification number
- 6-digit update attempt date
- 22 digit total

The before-the-fact data quality control routines on the surface need more space (22 digits against 6) but only a single digit, the action code, has to be included in the data record itself. The rest can go out in a report where space does not have to be conserved to the same extent.

As a result, the test number and test result are given separate fields, and provision is made for the potentially long update identification number and update attempt field.

Before-the-fact data quality control is particularly suitable for records where computations are not heavily used.

Figure 2 — Typical Breakdown of Before-the-Fact Field Requirements

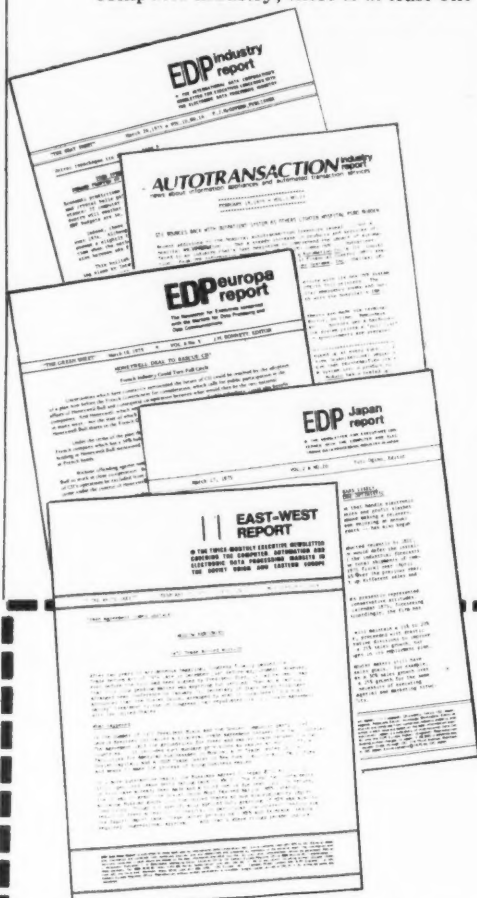
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## Letters To the Editor

### Clarifying Cobol

During the past few years, serious thought has been given to removing GOTO from high-level languages for the sake of clarity and ease of program maintenance.

More recently, it has been suggested that the ELSE from IF, THEN, ELSE be eliminated from Cobol. This expurgating of the Cobol language is still insufficient.

The NOT in the relational operators must also be eliminated. The operators EQUAL, LESS, and GREATER, along with the prefix NOT, should be replaced by EQUAL TO, LESS THAN, GREATER THAN, EQUAL TO OR LESS THAN, EQUAL TO OR GREATER THAN and LESS THAN OR GREATER THAN.

By being positive in our relationships, Cobol will be easier to understand and maintain.

Arthur G. Rauch

Florissant, Mo.

### Discouraging IT

Thomas Shafer wrote in the April 19 issue, promoting the inclusion of the IT reserved word in Cobol syntax.

Having attempted to use IT in a number of trial cases, I recommend a further expansion to include the verbs DECREASE and INCREASE, which would be used with IT.

For example, the statement  
 IF QUANTITY-1 EQUALS QUANTITY-2  
 ADD 1 TO IT.

is not understandable. The statement, with the INCREASE verb, would allow the desired clarity:

IF QUANTITY-1 EQUALS QUANTITY-2  
 INCREASE IT BY 1

would cause QUANTITY-1 to be incremented.

IF QUANTITY-1 EQUALS QUANTITY-2  
 ADD 1 TO IT

would cause QUANTITY-2 to be incremented.

As a further suggestion, since it often tends to confuse instead of adding clarity, IT should be discouraged.

Dwaine Voas

Minneapolis, Minn.

### All He Can Say...

In reference to "Honeywell User Feeling Ignored," the letter from Michael P. Eisman of Revere Electric Supply Co. [CW, April 23]:

Amen!

Larry D. Renbarger  
 Controller

Riblet Products Corp.  
 Elkhart, Ind.

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## Fortran-Based Data Management Eases User Interface

By Edward T. Ordman  
Special to Computerworld

LEXINGTON, Ky. — A mathematical approach to data base organization has paid off for the Office of Business Development and Government Services (OBD), a unit of the University of Kentucky's College of Business and Economics.

A locally developed Fortran-based data management system called the County Income Data Estimation and Retrieval (Cider) system has permitted production of economic summaries — including an extensive annual report — two to three times faster than previous methods which relied on individual applications programs. This has made possible production of more complete economic statistics for subregions of Kentucky than previously and allows many data series to be updated more frequently.

It also permits a large variety of tables

to be produced and in the mail within 24 hours of special requests from state and local government agencies.

OBD had several years of previous data base experience stemming from extensive contract work for the State of Kentucky and performance of staff functions for the Kentucky Council of Economic Advisors. Several projects currently under way involve the use of Mark IV (from Informatics, Inc.) and such statistical packages as SAS and SPSS, all already available on the University of Kentucky's IBM 370/165 (which replaced a 360/65 while this project was in process), as well as several programs acquired from Wharton Econometric Forecasting Associates.

### Initial Problem

The initial problem prompting the creation of Cider was the need for prompt analysis and distribution of economic

data on Kentucky's 120 counties, data received from the U.S. Department of Commerce and other sources. Once congressional districts and other regions of the state were added, this meant some 200 regions had to be considered — with about 40 time series per region in the initial "bite" of data.

Requests for data received by the Kentucky Council of Economic Advisors included such questions as:

- What is the per capita income of each county?
- What percent of the state's total mining income is in each county?
- How does the distribution of industrial income in Lexington compare with Louisville? Cincinnati?
- What percent of military spending in the state is in each congressional district?
- What percent of total income in each region of the state comes from transfer

payments (Welfare and Social Security)?

An early question faced was: Can all possible questions of the above types be categorized? By treating the data logically as a single, large multidimensional array, the questions above and many others reduced to extracting one or two appropriately oriented planes.

This simplified the data organization sufficiently to make it possible to program the system locally, rather than use a commercial data base system.

The desire to do the programming locally — and in Fortran if possible — arose from the fact that OBD employs only one full-time programmer. Graduate students employed as part-time assistants are unlikely to have background in programming languages other than Fortran; a Fortran-based system would therefore maximize the chance that they could help in the long run.

The actual programming was carried out in a top-down, modular fashion; the program finally consisted of about 30 sub-routines of 50 lines each.

The time from first planning to first operational output was about two months for one and one-half programmers, although improving and "polishing" continued much longer.

At present, data requests (from government agencies, newspapers and others) are batched and typically run once or twice a day; the data base is kept on a demountable IBM 2314-type disk pack. If demand increases sufficiently, the system could operate on-line with the data kept on a permanently mounted disk.

In the interim, data is being made much more widely available than previously, and at least one other state has indicated an interest in acquiring the Cider package.

Edward T. Ordman is a research associate and programmer in the OBD.

## 3277s Used as Consoles Under 'Docs'

By Don Leavitt  
Of the CW Staff

BROOKLINE, Mass. — Mid-sized IBM 360s and mid- to large-sized 370s under DOS can be upgraded by the installation of a CRT-based console and asynchronous printing of the control log through the use of the Display Operator Console Support (Docs) package from CFS, Inc.

Although Docs is expected to run along with the IBM 1052 typewriter conventionally provided the console operator, the IBM 3277 display units the software utilizes have many advantages over the electromechanical units.

Speed, reliability and impact of important messages — through intensity of message text — are three of the key factors, CFS said.

(Release 26 of DOS can be modified to support 3277s with a "PTF" available from IBM, CFS noted.)

Messages are displayed on the CRT more quickly than they can be printed on the 1052. Beyond that, a recent demonstration showed that operators who know what message to expect may enter their response even before the system's message has been completed; Docs stores the response and applies it as soon as the request itself has been completed.

Hardware failure on the 1052 often brings an entire system to a halt, but Docs operates independently of the 1052 so the system keeps going even if the typewriter console is down.

The stream of messages is spooled to any of the IBM or IBM-compatible disks prior to printing and, if the normal hard-copy device is unavailable, the control log can be put out on the line printer.

Disk storage of an entire day's control messages probably would not take more than four cylinders of 2314 space, ac-

cording to a CFS estimate.

The availability of a high-intensity display on the 3277 allows Docs to permit multiple outstanding requests for operator intervention. All such requests are shown in high-intensity characters to encourage the operator to react, but the system is programmed to keep operating without becoming wait-bound awaiting operator response to the first request.

As many as four 3277s can be managed by Docs with messages being directed to specific CRTs.

Docs will run along with any other spooling or control packages, such as Software Design, Inc.'s Grasp or The Computer Software Co.'s Edos.

The speed of the operations with Docs

is said to be so much better than without it that operators in one installation find they are utilizing the MAP facility of DOS and the Status facility of Grasp far more often than they could afford to do before Docs.

Docs requires 8K bytes of main storage and imposes no programming demands on the user's application programs.

Docs is available for DOS now for a one-time charge of \$5,670, but monthly and yearly leases are also available. Edos users may install Docs as a feature of their systems, even with six-partition support, under monthly, yearly or two-year lease plans.

CFS can be reached through P.O. Box 662, 02147.

## 'Plan IV' Adds History Reports to SMF Analysis

PHOENIX — IBM OS/VS users anxious to use data collected by SMF but frustrated by the format and content of reports generated by some data reduction packages have another solution to the problem with the Plan IV package from Capex Corp.

The package consists of two systems of programs for periodic and monthly reports, which run independently of each other although a history file created by the first system is input to the second.

The periodic processing starts with various editing and validation checks before accepting data from SMF records. There are a number of inconsistencies and incomplete pieces of data that creep into those records and could lead to very warped conclusions if accepted "as is," Capex noted.

Five types of reports are produced by this periodic processing system. A Job/

Step Audit Trail is a detailed "and generally lengthy" report showing information about every job step executed during a given time period. Step information may be omitted, the vendor said.

The Peak Hourly Periods Report presents an hour-by-hour picture showing the time periods in which various measures of system performance had a high or peak value.

The Critical Jobs Report shows the top 20 jobs in various, usually negative, categories such as "most CPU time," "most elapsed time" or "most disk I/O." The Critical Programs Report presents the same type of information but at the program level.

Both types of report allow the user to select criteria to be presented, and both include facilities to show correlation of two or more measures.

The monthly processing runs produce, for one thing, a calendar showing each day of the prior month (or any other month for which data is available in the history file) and the system activity for each day.

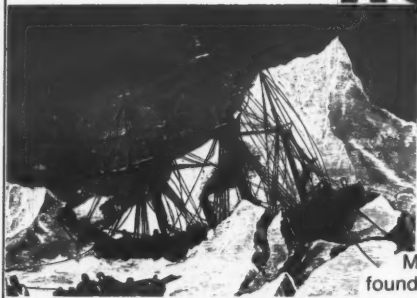
System Summary Graphs are twin histograms providing a breakdown of system and CPU usage.

A profile run shows job-related averages overall for the past month and the one prior to it. Complementing it, the Significant Changes Report shows aspects of system performance which have changed more than a user-specified percentage between the two months.

Plan IV for OS/VS1 installations may be leased for \$265/mo on a one-year term or licensed for \$4,750. OS/VS2 users face charges of \$320/mo or \$5,750.

Capex is at 2613 N. Third Ave., 85004.

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## 'Mapdisk' Does Just That

PORTLAND, Ore. — IBM DOS and DOS/VS users can now get an "easy-to-read, snapshot picture" of disk pack utilization with Mapdisk from Computer Concepts, Inc. (CCI). By analyzing the Volume Table of Contents (VTOC), Mapdisk shows all files in sequence by their physical location on the disk pack, CCI explained.

Mapdisk allows the user to see file locations by cylinder and track and to know the type of file and if the file is expired. Additional Isam

information such as record size, block size, location of last prime data record, independent overflow information and record counts for prime and overflow records is also provided.

Mapdisk also tells which free areas are available, the company noted.

The program is currently in use on IBM 2311, 2314, 3330 and 3340 disk packs and their plug-compatible replacements.

Mapdisk costs \$195.00 and is available from CCI at 6443 S.W. Beaverton Highway, 97225.

## Graphics Also Extended

## 'General Ledger' Gains More DBMS Ties

ANDOVER, Mass. — IBM DOS and OS users working with the MMS General Ledger package from Software International will have a range of extra-cost enhancements by the fourth quarter of the year, a vendor spokesman said recently.

While some versions of the package have already been interfaced with the Total data base management system from Cincom Systems, linkages to IBM's IMS and CICS software will extend the potential for generalized user-oriented reports that can be provided by the MMS General Ledger, he explained.

These reports can be created

out of any part of the data base available to the user and may be directly on-line to a variety of output devices, including CRT terminals and line printers. This reporting facility has a one-time charge ranging from \$5,000 to \$25,000 depending on the degree of sophistication of the interface required, Software International said.

Independently, any financial information generated by the MMS General Ledger can now be displayed in graphics form on either printers or special-purpose plotters. This capability includes complete user control over both format and content of the out-

put, but the system itself can provide accurate scaling of the graphs, according to the vendor.

The new graphics support carries a one-time charge of \$1,000.

Through arrangements with Foresight Systems, Inc., Software International is now offering the capabilities of the Foresight financial modeling software to MMS General Ledger users.

The MMS General Ledger system itself ranges in price from \$22,500 to \$42,500, Software International noted from Elm Square, 01810.

## Accounting Systems on Minis Aid Auto Parts Dealer, Distributor

LEXINGTON, Mass. — A series of software packages designed to facilitate minicomputer-based applications for distributors and retailers in the transportation parts industry is now available from Engineering Computer Systems (ECS).

Written in Basic for use on Digital Equipment Corp., Data General or Basic/Four hardware, the ECS packages provide inventory control, order entry and invoicing, accounts receivable, sales analysis and sales commission calculation. Programs for payroll processing and accounts payable control are also available as options, the company said.

In operation, the systems support multiple prices per item and files of customer characteristics. Automatic reordering of stock from vendors and mass price changes as vendors pass along cost increases are among the systems' other capabilities.

The packages vary in capability from one that accommodates one warehouse location, single price levels on 30,000 parts and as many as 200 vendors to one that manages six warehouses with multiple price levels on each part and multiple discount by vendor. The largest system includes interfaces to purchase

order control and other applications, ECS noted.

The systems can run on a DEC 16K PDP-8 or 96K PDP-11, a 32K-word Data General mini under RDOS or a 32K Basic/Four. The packages range in price from \$9,000 to \$22,000, the company said from 21 Worthen Road.

## 'Score Basic' Defaults Simplify Coding

NEW YORK — Programmer-selectable options added to a package as it develops over the years are generally well-intentioned, well-designed and well-received. But sometimes they can make the package so complex it becomes unwieldy for the user who isn't highly trained in its subtleties.

That is the problem faced by Programming Methods (PMI) with an upcoming release of Score, the Cobol processor/file

management system that has developed and grown since its first introduction in 1970.

In Score Basic, many of the options of Score, designed to provide flexibility, have been replaced by default values "which satisfy most of the needs of the end user," according to PMI.

The new approach simplifies the task of definition of data to be handled and Cobol code to do the handling and is aimed at clerks and managers without DP

reference Faster processing areas and symbolic labels on macros are retained in the converted programs. Comment card and most assembler statements are not altered by the translator. However, the translated programs tend to run in considerably less memory, SMM said.

### Man/Machine Combination

FLTS is a man/machine combination. The original Faster programs are fed through an initial translation program that does much of the basic work. The converted programs are then reviewed by an SMM consultant experienced in both Faster and CICS.

Cost of FLTS varies, depending on the number and complexity of the Faster programs involved and whether translations are done at the user's site or an SMM installation.

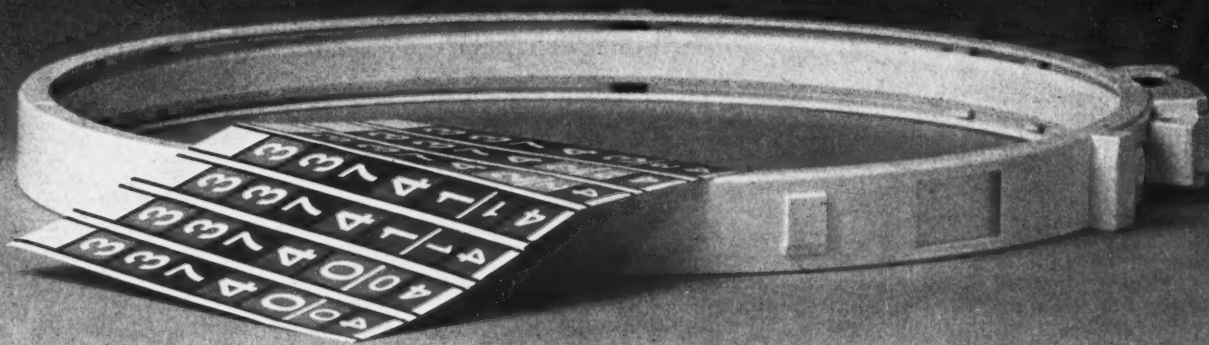
Typically, conversion of a library of 150 programs might cost between \$20,000 and \$25,000, a spokesman said from the Crocker Bank Building Penthouse, 1007 Seventh St., 95814.

backgrounds and small programming groups, PMI said.

The Score Basic system will initially be available only for IBM 360/370 and Burroughs users, while all other Score versions are available for other hardware environments as well.

Scheduled for first delivery in the third quarter of this year, Score Basic will cost \$10,000.

PMI is at 1301 Avenue of the Americas, 10019.



**Do it yourself.**

### Clarification

The outline under the chart accompanying the story of International Resources Development, Inc.'s (IRD) benchmarks of time-sharing networks [CW, May 21] should have indicated that the results shown applied only to a CPU-bound Fortran test run.

The chart was not intended as a summary of all the tests IRD ran.



## Medicare Managed

FREDERICKTOWN, Mo. — Hospitals and other health care facilities with NCR computers can cope with the increasingly stringent demands of Medicare patient qualification requirements with a package from Madison Memorial Hospital (MMH).

The system is said to solve the institution's reporting problems "with a minimum of involvement by the medical staff and very little disruption of hospital routine."

The software includes a medical data base of nationally recognized standards relating to diagnoses, length-of-stay and medical evaluation criteria, an MMH source said.

The system monitors each patient in the hospital using such information as medical diagnoses, patient age and surgery status and, on appropriate days-of-stay, initiates the admission and concurrent patient reviews required by new Social Security Administration guidelines.

Under those guidelines, the spokesman explained, hospitals have to medically justify each admission of a patient under Medicare or Medicaid and rejustify the patient's remaining in the hospital after a specified number of days.

The MMH package is written in Neat/3 and runs in batch mode on a 32K NCR Century 200. That hardware/software combination should be enough to manage the reports for hospitals with as many as 500 beds, the spokesman estimated.

The \$4,000 package can be ordered from the hospital here in Fredericktown, 63645.

## Planning Vital

# DBMS Must Fit or It Won't Work

By Nancy French  
Of the CW Staff

SAN FRANCISCO — "In selecting a data base management system [DBMS], be sure it's been thoroughly tested in an environment that duplicates yours as closely as possible," Greg Grosh, a senior technical representative for Cullinane Corp., urged Computer Caravan forum participants here recently.

"If you don't do that, there's no guarantee the system will actually work for you," he pointed out.

Grosh drew examples of "all the things that can go wrong with a DBMS" from his own experience on a team that attempted to implement a system

(developed for a small, single-location bank) at an 80-branch, 800,000-account bank in another state.

The project was so unsuccessful that the bank's entire DP operation was, in fact, eventually turned over to a facilities management company, Grosh said.

The first error the bank made, he explained, was in the purchase of the package. Bank managers at the vice-presidential level made the decision with no input from the DP department.

"The programmers and analysts responsible for implementing the program had no opportunity to even see the coding before the contract was signed," Grosh said.

Then, when the installation phase of the project began, no overall data base manager was appointed to coordinate the entire conversion. "Each application was headed by a different person, and they didn't talk to each other about what they were doing," he said.

### Good Idea Gone Bad

The system was based on a concept known as "Islands of Automation," he explained. "It was a network type of data base consisting of a central cross-referencing file linked to individual files for applications."

It was a good idea for a bank because it allowed management to find out a customer's total liability to the bank at any given time very easily.

Unfortunately, the bank had no standardized name and address format from branch to branch and application to appli-

cation, Grosh explained.

For example, in demand deposit accounting, Grosh himself was listed as "Gregory Grosh." For Master Charge at another branch, he was listed as "Greg Grosh," for installment loan he was listed as "Grosh, Ge#."

"Because we had a high-order sort key by branch, the system only resolved like names and addresses in the same branch," he said.

No one thought the matter too serious until it was found 12 IBM Model 2314 disk packs were being used for the data base, rather than the six originally planned, he said.

"Rather than creating a single cross-reference file, DP personnel soon found they had an average of 2.3 records for every bank customer," Grosh explained.

### Loss of Data

In addition to administrative problems resulting from poor coordination, bank employees soon found they had another problem — loss of data.

Since the access method used in the data base system was only tested in a small bank, it apparently never was tested to its full capacity.

At the Bank of California, however, the disk packs soon went into cylinder overflow and, when that happened, "they just got rid of the record," Grosh explained.

"Not only that, Pack 6, which contained the G's, lost its 'end of data' record so, when it was full, additional records just shuffled off the pack," he said.

Summing up, Grosh urged users to "get a good data base management package and IMS from IBM, IDMS from Cullinane, System 2,000 from MRI Systems, Adabas from Software AG are all good."

"Whatever else you do, get a technician to coordinate the conversion task."

"Don't attempt to bring up a data base management system with a few Cobol-oriented programmers, because a data base management system is a far baby — when one person touches it, you need 10 to get him out of it," Grosh said.

## Directory Lists

## Time-Shared Nets

NEW YORK — The first publication of a geographic directory of the local offices and executive personnel of companies that supply time-sharing products and services is planned for early fall, according to the Association of Time-Sharing Users (Atsu).

The Atsu publication will list executive personnel in the time-sharing industry by geographic location, covering companies that offer time-sharing services, equipment, terminals and software. The directory will be updated periodically, Atsu said.

The Atsu directory will be free to members, \$20 to others.

Atsu is at 210 Fifth Ave., 10010.

## 'Slang' Eases Non-DPers' CPU Access

NAPERVILLE, Ill. — "Proper" English may be the correct tool for conventional communication, but users who need to extract information from a data base and create reports that change in form or content from run to run may find Slang — now available from Bob White Computing & Software, Inc. (BWCS) — more useful.

Slang gained its name from its developer, Systems Language Co. of Chicago, and from its free-form input and output capabilities. The general-purpose tool is designed for marketing, auditing, operations or management people without heavy DP training, as well as for programmers building production systems.

Sorting, merging, selecting, computing, summarizing and totaling are some of the functions

available through Slang. Files to be accessed are described once by the user, BWCS noted.

Arguments defined by the user to manipulate the data and to produce the desired output will change from run to run. Since Slang is a load-and-go report generator, logic may be changed from one use to the next of the

"same" program without recompilation, BWCS noted.

Since the variable input is generally quite small, the edit for erroneous input is completed "in a matter of seconds."

The Slang package is available for \$5,400 from BWCS at 830 Diane Lane, 60540.

## Driver Links Floppies to PDP-11

SUNNYVALE, Calif. — Installations with Digital Equipment Corp. PDP-11s and DEC's real-time RT-11 operating system can move from paper tape I/O by utilizing AED 2500 or 3100P floppy disk systems and RT-11-compatible driver software from Advanced Electronics Design, Inc. (AED).

The driver supports the RT-11

file structure, permitting the floppy disks to operate as a systems device or auxiliary storage units. The software interfaces through a direct memory access for increased operating speed and CPU efficiency.

The RT-11 V02 driver, supplied on a disk, is available from stock for \$400. AED is at 754 N. Pastoria St., 94086.



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## With Government Funding

# British Package Backs Data Management

LONDON — A data dictionary package developed by Management Systems and Programming Ltd. (MSP), Datamanager is now scheduled for staged release throughout 1975 for IBM 360/370 users running under any variant of OS or DOS.

Funded at least in part by the British government's Software Products Scheme, Datamanager is designed to be completely freestanding and not locked into any other software system, package or data base management system (DBMS).

Installations with traditional files, data bases or a mixture of the two can use Datamanager, MSP said.

The dictionary setup, maintenance and interrogation facilities, released in May, are intended to provide comprehensive information on the attributes and relationships relevant to each dictionary

member. The attributes define the form and content of the data; the relationships define logical interactions with other members, MSP explained.

The system carries out all the necessary dictionary input, amendment, deletion and other maintenance requirements, providing control output at each stage. These functions are instigated by a comprehensive set of commands designed by MSP to be readily understandable.

### Security Mechanisms

Datamanager has a series of security mechanisms to ensure privacy. A password system provides for only legal access, while an ownership concept precludes access to unauthorized parts of the dictionary.

Individual dictionary members can have

protection levels allocated to them which limit the action that an individual dictionary user can take. Commands also cover integrity and the production of output listings for the person with overall responsibility for the data dictionary.

A series of interrogation commands allow the dictionary to become a development aid supplying documentation and information to the systems analyst and the programmer.

This information enables the analyst to be aware of the repercussions of proposed or planned changes of, for example, a particular item, or the programmer to discover all the files and programs which will be affected by the module he is to rewrite, MSP said.

An added feature, which will convert the data definitions found in Cobol or PL/I programs already in use in an installation into dictionary format, should be ready shortly.

Another facility due for release within the next few months will do the reverse, generating data definitions in Cobol, PL/I or BAL from the dictionary source language, the company said.

The implementation is also advanced in the area of providing interfaces between Datamanager and widely used DBMS teleprocessing monitors.

In all cases, Datamanager will provide output in the relevant DDL to ease the data-base specification and definition workload.

The price of Datamanager for U.S. users has not yet been announced, but sites in the UK apparently can acquire the software for an average cost for 5,000 pounds (approximately \$12,500).

MSP is at 71 Gloucester Place W1H 3PF.

## Random Notes

### Source Programs on Tape Managed by FSS Librarian

ORLANDO, Fla. — Florida Software Services, Inc. (FSS) has released a librarian which catalogs, compiles and maintains applications on magnetic tape rather than disk storage.

The system, called Source Program Librarian System (SPLS), is available at no cost to FSS IBM customers and can be purchased by other users at \$4,500.

Although there are many librarian systems on the market, few besides SPLS maintain job control streams, the firm said.

SPLS maintains Level D Cobol programs, Ansi Cobol programs, Assembler language programs, source statement library books and relocatable library object decks. The firm can be reached through P.O. Box 2269, 32802.

### SEL Upgrades Aided

FT. LAUDERDALE, Fla. — Users of the Systems Engineering Laboratories, Inc. (SEL) 810A and 810B mini-computers can migrate to the newer SEL 32 while preserving their investment in existing software by utilizing an 800/32 program translator now available from SEL.

The translator converts macro assembly code but cannot handle higher level languages, the company said. Instructions that cannot be translated are flagged on the side-by-side 800 and 32 listings produced by the package.

The translator package, in binary code, is distributed free to SEL 32 users.

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## Users Urged to Increase Regulatory Role

By Patrick Ward  
Of the CW Staff

ANAHEIM, Calif. — Users ought to take a more active part in telecommunications regulatory battles, since it is impossible to be unaffected by them today, Attorney F. Sherwood Lewis told attendees of the recent National Computer Conference.

The role of regulation is to administer "so-called 'natural' economic monopolies on the behalf of the public," the assistant corporate counsel for Sanders Associates said.

But "there are so many issues staring the regulators and legislators in the face today that mistakes, especially where DP is concerned, can be easily made unless the authorities have help."

Telecommunications regulation comes at either the federal or the state level, Lewis said, and "the confrontation over which agency or agencies will ultimately regulate communications and interpret what should be regulated and what shouldn't is fierce, and the infighting quite bloody."

Herein may lie "the deepest, most profound regulatory issue" facing the user community, Lewis said. Users are either going to be dealing with a "unified network regulatory scheme managed at the federal level," or with the views of 50 state jurisdictions.

"In the latter situation, we are not going to be on equal footing with the carriers," he observed.

The issue is currently in the courts, but if the court decision is unsatisfactory to DPs, "this community may have to politically coalesce in order to gain a legislative solution."

So far, it has been mostly vendors who have fought the regulatory battles, Lewis said. It is not altruism that motivates them, however, and they won't neces-

### DDI Terminal Gets APL/Ascii Feature

GREENWICH, Conn. — Data Dimensions, Inc. (DDI), a supplier of data communications equipment, has announced a switchable APL/Ascii option for its Model 265 portable KSR terminal.

The APL/Ascii option gives the user the choice of either full APL graphics or complete upper/lower case standard Ascii characters. All DDI 200 Series terminals are serviced nationally by NCR.

This feature for the Model 256 portable KSR terminal is said to enhance the price/performance capability for users who require both APL and standard Teletype/Ascii-compatible terminals.

The DDI Model 265 with APL/Ascii option will rent for \$135/mo for a 12-month term, including full on-site maintenance. Purchase price is \$2,895 from 51 Weaver St., 06830.

sarily be representing user interests before the regulatory bodies.

Three major regulatory landmarks created today's user environment, Lewis said.

#### Initial Interpretation

The Carterfone decision was "initially interpreted as allowing connection of customer-provided equipment to the telephone network so long as harm to the system did not occur. 'The moment the Federal Communications Commission (FCC) issued this finding was the moment resistance to it from the carriers set in, and we have been fighting it ever since,' Lewis remarked.

The Hush-A-Phone case held a customer has a right to use his phone service in ways which are privately beneficial without being publicly detrimental.

The Computer Communications Inquiry articulated "the public policy that communications and data processing are separate industries, while still recognizing that the technologies supporting these industries are converging, Lewis said.

"The bright operational results that many of us foresaw when the decisions were first handed down have not materialized; the lawyers, however, have been quite busy," he stated.

#### Legal Questions

The legal questions all focus on "Who is going to own and control equipment found at the terminus of the telephone company copper? Will the situation return to be the exclusive province of the carriers or will there be competition for the supply of this equipment?" Lewis asked.

The carriers say harm could follow the installation of foreign equipment on their systems. Some classes of service, notably residential, might have to be repriced because current pricing considers the total offering of the phone company, and there will be an absence of revenues from supplanted equipment and services.

For their part, suppliers say all sorts of terminal equipment can be supplied in a competitive environment and the public will benefit from this.

While it is too early to predict the eventual outcome of these issues, the drift seems to be toward allowing customer-provided interconnection, through carrier-approved connecting modules that are built into the equipment. Or, the equipment itself may be certified as harmless, Lewis said.

The next question is who will install and maintain these devices? "Must it be the carriers? If it is the user... will he have to be licensed or certified somehow? Will the same rules apply to carriers who may be supplying equipment competitively under the ruling? The users need to be heard here or they may end up with an

extensive and unnecessary overlay of regulatory administration."

#### State Regulation

Turning to a "somewhat more bleak landscape — the state regulatory scene," Lewis recalled two years ago the North Carolina Utility Commission issued a proposed rule which would in essence ban interconnection of any equipment not supplied by the telephone company.

DP manufacturers eventually managed to have these proposed rules modified, but the North Carolina proposal was essentially overturning Carterfone and "made the FCC sit up and take notice," Lewis said.

The FCC told the North Carolina Utility Commission it couldn't do what it was proposing to do and thus a major issue was joined between the Federal Government and state government.

While other states have attempted similar moves, California remains a bright spot, Lewis said. There, "some tough litigation has produced an interim order outlining rules by which interconnection of non-telephone company equipment may be made to the network.

#### 'Probably the Bellwether'

"These rules are probably the bellwether for the federal rules," Lewis predicted.

"This equipment is properly certified by an independent certification laboratory or a registered professional engineer with no fiduciary ties to the applicant seeking certification. Ancillary and data equipment will be directly deemed to contain protection for the network and may be directly connected."

The carriers connecting arrangements will still be available, and yet that step can be eliminated if a customer so chooses.

"The degree of freedom here is considerable. The matter is still under litigation, and this may not be the final outcome, but it does show what can be done if effort is put into the problems," Lewis concluded.

## Packet Switching Goes Commercial

By Ronald A. Frank  
Of the CW Staff

WASHINGTON, D.C. — Telenet Communications Corp. plans to become the first commercially tariffed packet-switched service carrier some time this month. The company is expected to file its initial tariff and begin service to customers in a seven-city area.

For communications users, the inauguration of Telenet service will mark the first time packet-switching technology developed on the government's Arpa net has been offered commercially.

A Telenet subscriber will pay a monthly charge made up of three components. These will include a traffic charge based on the amount of data transmitted, an access port charge and an access line charge.

The traffic charge will be 60 cents per 1,000 packets with each packet containing up to 128 characters.

Dedicated private line service for speeds up to 300 bit/sec will cost \$75/mo; 1,200- to 1,800 bit/sec will cost \$150/mo; 2.4- to 56 kbit/sec will cost \$200/mo. Dial-up port service will cost \$100 up to 300 bit/sec; \$200/mo for 1,200 bit/sec; \$320/mo for 2,400 bit/sec; and \$400/mo for 4,800 bit/sec. An on-demand dial-up port service for speeds up to 300 bit/sec will be available also at \$1.40/hour, Telenet said.

Multiple-connection host service surcharge includes a minimum per host CPU access line which handles up to 50 simultaneous connections and costs \$200/mo. The surcharge per connection over 50 per month costs \$4/mo, the company said.

Telenet service will begin in Boston, New York, Washington, D.C., Chicago, San Francisco, Los Angeles and Dallas this month. Initial service will be limited to speeds up to 1,200 bit/sec. The carrier is at 1666 K St. N.W., 20006.

## Printer Works With IBM 3270

MELVILLE, N.Y. — Camco Equipment Co. has introduced a printer for the IBM 3270 terminal system that offers faster print speed at a considerable savings to the user. The printer is plug-compatible with the IBM 3271 and 3272 controllers and is "totally transparent" to protocol changes such as potential software upgrades to Synchronous Data Link Control (SDLC), Camco said.

Called the Model 165, the Camco printer operates at 165 char./sec compared with IBM's top print speed on the 3286 of 66 char./sec.

The Camco unit also prints a 9 by 7 dot matrix character compared with the 4 by 7 character provided by the IBM units.

The Camco device has vertical forms control, bold-face characters on command, a visual and audio alarm system and an adjustable platen, all of which are not available from IBM, according to Camco.

The Model 165 costs \$6,795 compared with \$8,830 for the IBM printer. Maintenance is provided nationally by Indeserve and delivery is 60 days from 900 Walt Whitman Road, 11746.

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GTE has introduced its Comp-Acct transaction terminal series for fast food sites. The terminals are controlled by a processor containing 8K writable storage and 4K firmware. The terminal can operate at speeds up to 2,400 bit/sec on dial-up lines and the system is IBM 370-compatible using binary synchronous transmission. A three-terminal system with processor costs \$14,000. GTE Comp-Acct is at 145 Caldwell Drive, Cincinnati, Ohio.

## HP Dual-Processor CRT System Operates in Distributed Networks

PALO ALTO, Calif. — Hewlett-Packard (HP) has combined remote job entry (RJE) and other applications into a dual-processor terminal system designed to operate in distributed networks.

Called the HP 2000 Access System, it can serve as concurrent RJE satellite systems to IBM or Control Data Corp. host mainframes.

The HP system simulates either an IBM Hasp-II multileaving workstation or a CDC User 200 terminal for synchronous intercommunication. As many as 32 terminals may be running interactive Basic programs while the system is managing batch RJE operations.

RJE I/O can flow among multiple card readers and line printers or from Basic language programs through an Ascii file system. Any of the 32 terminals can

initiate data transfers and other RJE functions to and from the mainframes.

Data to be sent to the central system may be preprocessed on the system before transmission. The nuisance of carting punched cards or magnetic tape to and from the data center can be eliminated by

## Terminal Transactions

using a 2000 access system interactive terminal to exchange data, HP said.

User application programs can be developed in HP's extended Basic — an English-oriented, "easy-to-use" language. The system has local capabilities powerful enough for most data entry, computation and administrative purposes, yet requirements for large-system power now can be served through the network.

The local system's on-line disk storage may be used to spool data for transmission to or from the big system.

### Two 21MX Minis

The key to the 2000 access system's high throughput is said to be in its dual-processor design. Each processor is one of the HP 21MX minicomputers, with 650-nsec semiconductor memory.

The first is a system processor dedicated to application programs, program development and disk I/O. The second is a communications processor microprogrammed to manage asynchronous user terminal interaction at speeds up to 2,400 bit/sec, synchronous communication to IBM or CDC hosts at speeds up to 4,800 bit/sec and local peripherals.

The 2000 Access Basic software gives full program access to locally attached peripherals through HP's Ascii file system.

### Character String Manipulation

In addition to the computation facilities normally found in the Basic language, 2000 Access Basic provides character string manipulation and data file management abilities.

The HP 2000 Access System can be used for collecting and editing data at the source.

The system utilizes the microprocessor-equipped HP 2640 CRT terminal. The CRT is said to enable the nontechnical person to format the screen to resemble source documents, then enter data conversationally by filling in blanks.

Data entered through any one of the 32 video keystations can be transmitted concurrently to an IBM or CDC CPU.

### Two Versions

HP's 2000 Access Systems come in two versions, Model 30 and Model 40. In addition to two 21MX processors, each has a 30 char./sec system console, an 80 char./in. magnetic tape drive, a paper tape reader and a system cabinet.

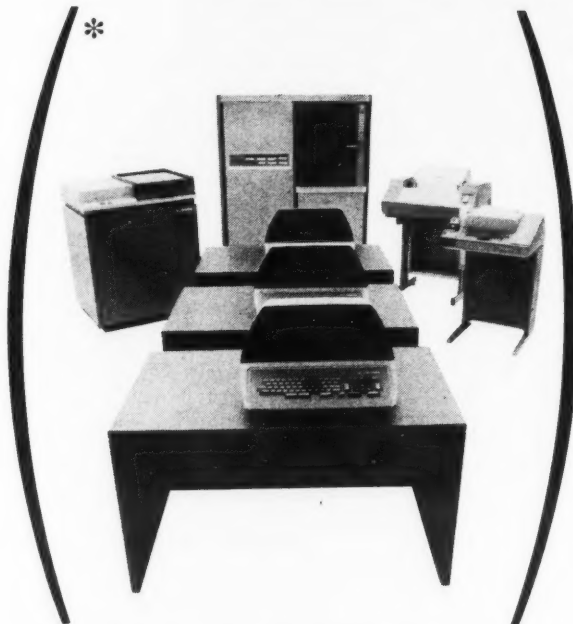
Model 30 has 96K bytes of main memory, a 5M-byte disk and a 16-port asynchronous communications multiplexer. Prices begin at \$59,900.

Model 40 has 128K bytes of main memory, a 15M-byte disk (25-msec average access) and a 32-port multiplexer. Prices begin at \$67,600.

Lease prices under a five-year plan average about 2.1% per month of the purchase price. Synchronous modem interfaces are also available with the system.

First customer deliveries of 2000 Access Systems are scheduled for September. Earlier HP 2000F systems are upgradable in the field, depending on present configuration, for a price ranging from \$8,500 to \$11,500.

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**The GCS 2100 can accommodate up to 64 local or remote terminals:** local terminals can be located up to 2500 ft. from the system's CPU. You get faster, more accurate data entry for functions like payroll, shipping, receiving and manufacturing, because the person most familiar with the data does the keying.

The GCS 2100 also offers data entry from remote terminals (it can handle up to five remote terminals over one dedicated telephone line).

**A Programmable Extension Package (PEP) extends the power and the flexibility of the 2100 system:** up to 255 PEP tables provide capabilities like automatic data insertions; range and value checks; table look-ups; logical tests; character expansion; and data dependent format switching.

These tables are not job assigned, so they can be used on several different jobs.

A library of over 100 special edits is also available. (If there isn't an edit for your needs, we can design one.)

The GCS 2100 also provides up to 99 format levels per job; up to 255 balance accumulators; variable length record and blocking factors; and up to 255 jobs stored in the system.

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## Economies of Scale Seen Pushing Users Into Networking in Future

By Patrick Ward  
Of the CW Staff

ANAHEIM, Calif. — "There are fundamental economic forces driving us into networking," Lynn Hopewell of Network Analysis Corp. told a recent National Computer Conference session on "Future Prospects in Data Processing" here.

Until recently, computer operations in this country were like cottage industries in England 200 years ago. As railroads were later to boost Britain's standards of living by making economies of scale possible, so the availability of new, cheap common carriers will swing users into the advantages of networking, Hopewell said.

Virtually every advanced country in the world is now developing or implementing packet-switched networks, he stated.

Today, 99% of network users are technologists of some sort, but eventually the majority will be nontechnically oriented users seeking services they will be able to economically share over networks, he said.

### On the Other Hand . . .

On the other hand, users may run into a lot of difficulties in trying to use a network, cautioned David Crocker of the University of California at Los Angeles' Electrical Engineering Department.

Crocker, an Arpa network user, cited the problem of accountability. How does the user trace a particular element in the net giving him trouble? he asked. Or how would the remote user locate the appropriate programmer with the network to obtain advice?

### Need for Standardization

The packet-switched nets can give the user a wide range of processors and application systems from which to choose, but he can be vexed in trying to access one particular system and in one way and then another in a different way, he said.

There is a great need for standardization within such networks to create a familiar and effective environment in which the user can work, he said.

With any network, there is the danger that its designers and implementers will be less aware and responsive to the user's needs "since he is no longer down the hall," Crocker said.

Hopewell commented that the packet-switched nets trace back to research projects, where the funding came in whether users were disgruntled or not.

"When competition in the marketplace is beating networks over the head, then you'll see some innovations" designed to please users, he said.

Networks are attractive because they

## AJ Modem Features Quartz Crystal Control

SUNNYVALE, Calif. — Anderson Jacobson (AJ) has a quartz crystal-controlled, 1,200 bit/sec modem on a card, the MU 1291. This modem is part of AJ's Series 12 multiple modem system and M2 dual modem system.

### Bell 202 Compatible

The MU 1291 is compatible with the Bell 202 data set and operates over dial-up or private lines. Standard features are auto answer, 5 bit/sec reverse channel and local and remote test.

### Long-Term Stability

Quartz crystal control of both the transmitter and receiver combined with digital circuitry are said to make the MU 1291 reliable with long-term stability.

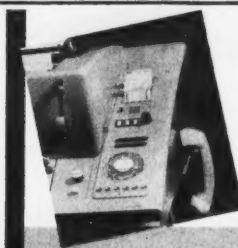
The MU 1291 rents for \$17.25/mo and the purchase price is \$350. Delivery is immediate from 1065 Morse Ave.

make available services that can't be received locally and because they provide the economies of shared use. And they also happen to be currently fashionable, Robert Blanc of the National Bureau of Standards told attendees.

Users have to ask themselves why they want to have or use a network in the first place and have to realize what they're getting into, he said.

How many terminals will the user need? This requires a traffic load estimate, which is not easy, he said. What sort of communications hardware is required, what sort of interfaces? Does the network control software take substantial core or disk space?

Beyond this, much needs to be done in the performance measurement of networks, he said.



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## Bad News for Bad Checks

LOS ANGELES — A computer system that enables a supermarket chain to control its own check-cashing procedure and curtail bad checks is in use at the 37-unit Boys Markets here.

It is described as the first on-line, dedicated check-control system in the country, according to a TRW Data Systems' spokesman.

The TRW system maintains files so that any cashier at any unit will know if the customer has cashed a check anywhere within the chain in recent days, he added.

In operation, the check cashing control system utilizes a central processing computer at headquarters, with a simple keyboard terminal at each check-out lane. A transaction is keyed into the system and a response given in three seconds — considerably faster than conventional manager approval, TRW said.

With each transaction, the central computer file is updated, maintaining a record of both the customer's check-writing history as well as the checkers' use of the equipment.

The system operates in a mode known as "positive by exception." All checks are cashed unless the customer has had a previous bad check.

When a check-cashing inquiry is made, the file is searched for the identification number. If the record is not on file, it is placed there.

The equipment involved in the system includes a TRW Model 4005 central processor with 32K words of memory, a magnetic disk storage unit, a 9-track magnetic tape unit, a teletypewriter console, a central security administrative terminal, store controllers, check lane terminals and store manager displays. The system operates over voice-grade telephone lines.

## Alaskan Network Runs Over Lines Of 23 Different Phone Companies

By Toni Wiseman  
Of the CW Staff

SEATTLE — The management of a data communications network which includes drops in such places as Juneau, Ketchikan, Sitka, Wrangell, Petersburg and Yakutat, all in Alaska, is not an easy task, especially when you have to contend with some 23 different telephone companies.

Don Cowan, DP manager for Alaska Airlines, recently described the decentralized organization of his company, in which the DP organization is part of the finance division and communications falls in the sales and services division.

The communications department at Alaska Airlines has three basic functions: network design for a network which is constantly changing as new telephone facilities become available and as the air-

line's operation changes; network monitoring and analysis; and equipment maintenance.

All terminals and modems are maintained in-house, Cowan noted. Four full-time and two part-time people move about maintaining 172 CRT terminals, 24

## Terminal Transactions

typewriter terminals and 38 printers in 12 cities with 56 unique locations.

The systems and DP department is responsible for all of the normal commercial applications, handled on a small in-house Univac 9300 system and on CPU time purchased from two different service bureaus in Seattle.

The communications system at Alaska Airlines runs from a CPU in Los Angeles to Seattle and then to all stations in Alaska. Its sole function at this time, Cowan noted, is for passenger reservations and to switch the numerous daily messages required to operate the airline.

In the near future, however, the system will also be used for data collection, feeding the internal DP system for use by other DP systems.

### Keys to Success

Cowan proposed four keys to successful network management.

- A good workable organization. "You need one that's responsive and can get the job done... one which will make most efficient use of your resources," he said.

- Good network monitoring equipment. "To be responsive, the problem needs to be diagnosed quickly and back-up equipment or parts need to be readily available. The diagnostic equipment should be tailor-made to the particular system," he said.

- Responsible, trained personnel. "They need to be trained and responsive. We have found that they also need to be flexible and have flexible wives," Cowan quipped.

- Good vendor support. "Fortunately, most vendors do a tremendous job supporting their equipment, but this should be a major factor in equipment selection, especially in remote areas."

The alternatives for network management, Cowan said, are depending on the vendors, going to an outside contract or doing it yourself.

### Three Unusual Aspects

Alaska Airlines went on-line about two years ago as a sharing user in another airline's passenger reservation system. The CPU is located in Los Angeles and the network that was used initially was a simple multidrop design.

There were, however, three unusual things about Alaska's arrangement, said Dave Zehrung, communications planner for the airline.

First, the geography of the system was laid out almost in one straight line from the CPU to the most remote terminal.

Second, there was a segment in the middle of this geography over which no high-speed circuitry was available, so it had to "run directly to the nearest points and around through the back door to the more distant ones."

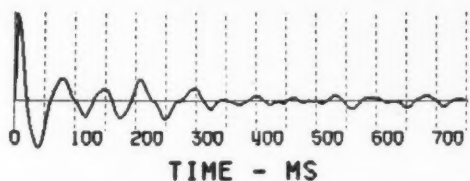
Third, there were several areas where the airline wanted to install computer terminals in which no voice grade circuits were available, "so the network was designed with several downline subprocessing installations to run a low-speed data or teletypewriter circuits at speeds that could be accommodated on available circuits," Zehrung said.

# NO SQUINT!

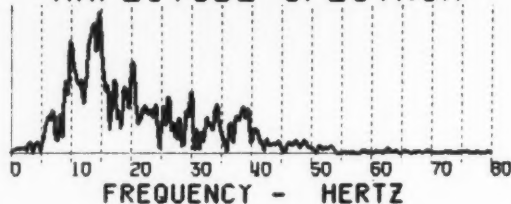
CDP NO. 190 DISTANCE  
WINDOW NO. 1

START TIME 400  
END TIME 2100

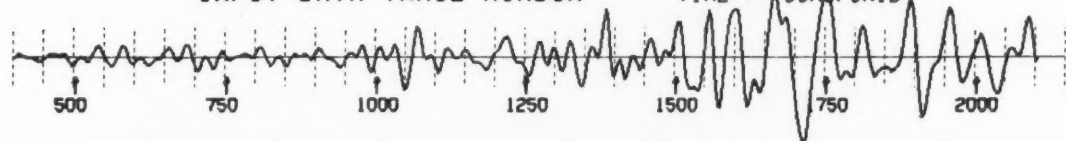
AUTOCORRELOGRAM



AMPLITUDE SPECTRUM

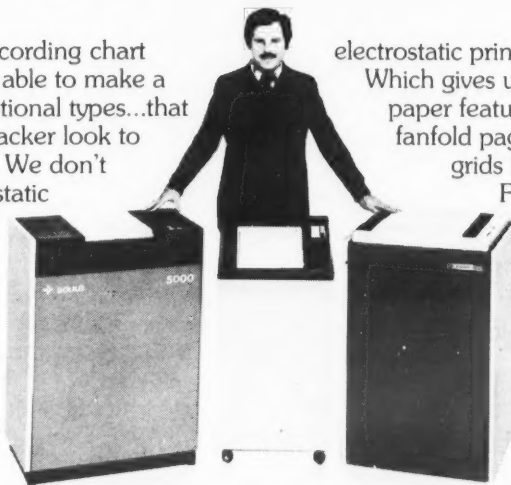


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## Bits & Pieces

### Grumman Printer Controller Available on Rental Basis

WOODBURY, N.Y. — The Grumman Data Systems Corp. printer controller, a device that enables the IBM 1403 printer to be operated by a non-IBM computer, can now be rented as well as purchased.

Grumman recently acquired rights to manufacture and market the printer controller from Spur Products Corp., which offered the unit for sale only.

Each model can be rented for \$425/mo. Minimum rental period is one year. The purchase price is \$17,000 for each unit.

Available models are plug-compatible with the Control Data Corp. CDC 3000 series, Xerox Sigma series, Digital Equipment Corp. PDP-8, -10 and -11, General Automation SPC-16 and 18/30, IBM 1130, Digital Scientific Meta IV and Univac and Burroughs computers.

Nationwide maintenance is provided at \$75/mo. The firm is at 45 Crossways Park Drive, 11797.

### Tape Protector Added

ROCHESTER, Ind. — Local severe electrical storms, passing or nearby radiating electronic/electrical gear or equipment, power generating equipment, etc. may distort, partially erase or degrade vital data on cassette tapes, according to Advance Magnetics.

For \$15 apiece, the firm can supply users with Model CTDPA Admu protectors which are said to provide physical as well as magnetic protection to tape cassettes. Each protector's capacity is one cassette tape.

The firm is at 226 E. Seventh St., 46975.

### PPI Device Detects Transients

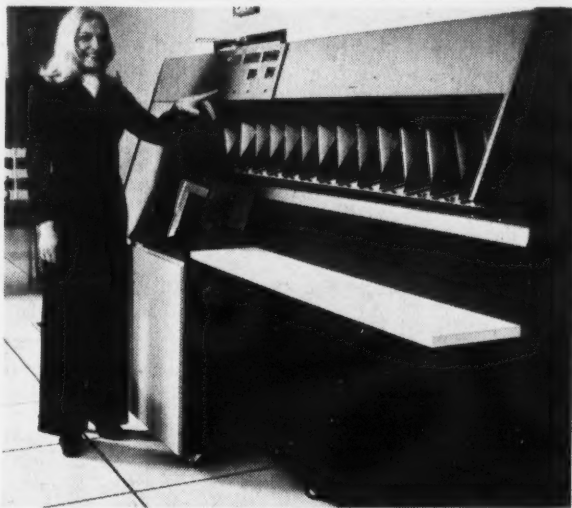
MENLO PARK, Calif. — Programmed Power, Inc. (PPI) has another transient direction detector which is designated the Model 3402.

The direction from which transients emanate, the load or the source is detected and recorded by the Model 3402, with a hard-copy printed out showing the transient polarity.

The instrument also detects, counts, categorizes, clocks and records five elements of line disturbance information: frequency error, undervoltage, overvoltage, low-magnitude transients and high-magnitude transients.

It monitors single- and three-phase power mains, 50 and 60 Hz, 100 to 500 Vac. Transient risetime response is 0.2 msec and transient amplitude sensitivity is 40 volts peak to 1,000 volts peak, the firm said.

The Model 3402 is priced at \$5,300 from the firm at 141 Jefferson Drive, 94025.



CDC 979 Bank Entry Subsystem

## CDC Bank Subsystem Reads, Sorts Checks

MINNEAPOLIS — Control Data Corp. had unveiled a computerized system to help process the rapidly growing volume of checks flowing through the nation's banks each year.

Called the Control Data 979 bank entry subsystem it reads and sorts checks, while automatically rejecting those containing errors so that corrections may be made before accounts are updated, CDC said. IBM and CDC compatibility are available.

The subsystem has newly designed computer hardware, including a reader/sorter, system controller and peripheral equipment, designed to allow banks to decentralize check-processing activities.

A software package supports: magnetic ink character recognition (Micr) transaction capture, CRT reentry and reconciliation of Micr rejects, CRT creation and maintenance of user parameter files, alphanumeric data entry, flexible sort patterns, on-line balancing, failure recovery, report writing and processing of Automated Clearing House (ACH) tapes.

The complete software package, running under CDC's Mass Storage Operating System (MSOS), is installed ready to go.

In the final development stage, the company said, is an optical character recognition (OCR) read option which can be used with the 979 reader/sorter to allow simultaneous reading, both magnetically and optically, CDC added.

The basic 979 system — including reader/sorter, system controller and peripherals — may be purchased for \$176,345, with maintenance and software support of \$1,060/mo. The basic system also may be leased at \$4,721/mo with maintenance.

Available as options are a line printer, with two on-line error correction stations and fine sort capabilities for \$214,460 and basic maintenance and software support of \$1,377/mo. Lease price for this system is \$5,760/mo.

CDC now is accepting orders for the system, with initial shipments to customers scheduled in the first quarter of 1976.

## Greyhound IBM-Compatible Set Replaces Standard I/O Systems

PHOENIX — In response to the continued high level of demand for standard IBM I/O sets (1403, 2540, 2821), Greyhound Computer Corp. (GCC) has announced the Greyhound Phoenix I/O Subsystem, a plug-compatible replacement for the standard I/O set.

The heavy use of the standard I/O set by current 360 users and IBM's decision to continue its use on the 370 line has placed the standard I/O set in short supply, the firm said.

In addition, IBM's limited production of I/O sets has served to further compound, the short supply situation, thereby stabilizing rental and purchase prices for the standard I/O set at levels well above prices for other 360 equipment, GCC added.

The two basic versions of the GCC I/O subsystem are:

**System A**  
controller  
1,800 line/min printer  
1,000 card/min reader  
100 card/min punch

**System B**  
controller  
600 line/min printer  
600 card/min reader  
100 card/min punch

The Greyhound Phoenix I/O subsystem can be configured with up to eight I/O devices. Systems A and B can be configured with any number of printers up to seven.

In comparison with the IBM 2821 controller, the GCC controller is said to offer:

- Support up to 8 I/O units vs. 1, 2, 3 or 5 for IBM.
- Any mix of peripherals up to 8 vs.

limits by model for IBM.

- No metering.
- Buffering of 8 card images and 8 print lines vs. two card images and one print line on the IBM.
- Remote capability up to 2,500 ft.

Presently GCC is using Data Products Corp. printers.

A one-printer system from GCC is said to cost \$200/mo less — two printers \$600 less — than IBM prices under the Fixed-Term Plan.

System A on a two-year lease is priced at \$2,600; System B on a two-year lease is priced at \$1,800. Sorbus, Inc. and Comma Corp. are scheduled to do maintenance. The firm is at Greyhound Tower, 85077.

## Telefile Line Printer Family Said To Duplicate IBM 1403 Speed

IRVINE, Calif. — The T-7460, a line printer said to duplicate the speed and quality of the IBM 1403, highlights a 14-model family from Telefile Computer Products, Inc. of buffered line printers for Xerox and Sigma computers.

A horizontally moving character band enables the T-7460 to provide speeds up to 1,500 line/min using a 48-character Ascii print set on a 132-column format, the firm said. A powered forms stacker to keep pace with the printer's output is standard equipment on the T-7460.

The top-of-the-line T-7460 is designed specifically for high-volume DP center operations. Other models include character band and drum printers with speeds ranging from 240- to 1,250 line/min to

cover all printer applications.

Each Telefile line printer is a complete system, supplied with all interface and control electronics to connect directly to the Xerox or Sigma input/output processor. The interface is plug-to-plug compatible and fully transparent to all Xerox operating systems, the firm said.

Models are available with an extensive variety of features, including character set memory, code conversion, changeable fonts, self-test, parity check and hammer verification.

The Telefile line printers can be leased or purchased; prices start at \$12,750 and run to \$55,000 for the T-7460. The firm is at 17131 Daimler St., 92705.

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# Who'd dare introduce a data system with FORTRAN?





Only a company with a data system that has so much you won't care what its high level language is called.

Data General is the company. And the data system is the Eclipse™ C/300.

Eclipse C/300 is an on-line, multiterminal, interactive data system that extends and complements your present large computer system. A system you can actually afford to use for dedicated operational support.

It has a data base-oriented file system called INFOS™ that has all the conventional access methods: SAM, RAM, ISAM. Plus an unconventional method called DBAM (Data Base Access Method).

DBAM has such advanced features as data base inversion, dynamic space management, hierarchical key specification, partial records, generic and approximate keys, and relative position processing.

INFOS works with our Mapped Real-time Disc Operating System (MRDOS) which supports dual operations such as multiterminal on-line activity at the same time as batch processing or direct communication to other computers.

Our new, easy-to-use RPG II generates planned and unplanned reports.

You also get our re-entrant multitasking FORTRAN with full INFOS data manipulation capabilities that make it ideal for on-line multiter-

minal environments.

And to communicate with your 360/370, our multileaving, interleaving HASP emulates IBM's remote job entry workstation.

The computer is the state-of-the-art Eclipse C/300. The one with 256K byte memory capacity, a comprehensive commercial instruction set, optional Error Checking and Correction (ERCC) that automatically corrects errors in main memory, and support for a mammoth 700 megabytes of on-line storage.

Yet a 96K byte Eclipse C/300 computer with ten million bytes of disc, line printer, 60K CPS tape drive, 2 CRT's and a synchronous communication adapter plus INFOS, RPG II, FORTRAN, MRDOS, Sort and Merge, HASP and utilities costs less than \$80,000.

Which is a language anyone should be able to understand.

- ☐ Send me the Eclipse C/300 brochure.
- ☐ Send me a sales engineer.
- ☐ Send me the brochure that shows how small computers can be dedicated to operational support.

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Data General Corporation, Southboro, Massachusetts 01772. (617) 485-9100. Data General (Canada) Ltd., Ontario, Data General Europe, 15 Rue Le Sueur, Paris 75116, France. Data General Australia, Melbourne (03) 82-1361/Sydney (02) 908-1366.



## For Small Maryland Bank

# COM Speeds Service, Ups Throughput, Reduces Costs

FREDERICK, Md. — A bank need not be a colossus to take advantage of computer-output microfilm (COM), according to Roger Nicodemus, program system analyst for Farmers & Mechanics Bank here.

"We've been able to trim our mainframe time by a ratio of about 8.5:1, supply overnight trial balance sheets and cut our hard-copy cost significantly with our COM," said Nicodemus.

With some 100,000 checking, savings and loan accounts and \$160 million in assets, Farmers & Mechanics ranks ninth in the state, perhaps not large by some standards, but large enough to be a formidable competitor in its province.

Farmers & Mechanics, with a main office in Frederick and 12 branch locations throughout this agricultural county, linked its Memorex 1600 COM to an IBM System 370/125 in 1972.

"One of our first successful applications with COM was to produce two trial balances each night which could be made available throughout our system by the start of the following working day," Nicodemus stated. "In the former form, these two balances were each about 500 pages in length. Today they are contained on a small portion of cassette."

Today, using COM, Farmers & Mechanics also produces demand deposit records, savings records and customer statements on a daily basis and installment loans on a twice-a-week basis.

All DP for the bank system is conducted and retained in the Frederick main office, he stated. When bank personnel in the branches wish information on accounts in their jurisdiction, they merely telephone into the

main office where other personnel quickly reference the information required on one of 12 COM viewers.

Because records are a vital part of any bank's customer relations, not to mention myriad legal requirements, record storage is a necessary and costly part of the banking business. COM has aided in cutting the cost of this record storage.

"Specifically, we now have all our account records in a single

cabinet in our fireproof vault," Nicodemus said, "but the file is not at all filled. In fact, we believe we have enough space in the file to keep all our computer output for the next 10 years."

Founded in 1817, Farmers & Mechanics entered the branch banking field in the early 1950s with a steady stream of acquisitions throughout Frederick County. While effective in bringing in new customers, the branch system did bring problems —

problems now overcome by microfilm.

"We cover a small geographical area," Nicodemus explained, "so, often a customer at one branch drops into another branch to ask a question about his account."

"This in the past meant searching about to find just which branch had the record. With the advent of our DP center this information could all be obtained with one telephone call to

the main office."

Farmers & Mechanics also uses three flash forms for its COM: a standard form for accounting practices on the balance sheets, a check statement form and an installment loan form. The COM flash form superimposes form columns and headings on film simultaneous to the data being printed on film. Consequently, programming form headings and columns within the computer is eliminated.

## Now computers can talk to each other The Bell System Introduces

Two-station and multi-station private-line service is now available between Boston, Chicago, New York, Philadelphia and Washington. The system will be expanded to 19 other cities this year, and we hope to serve many more metropolitan areas in the near future.

The Bell System's new Dataphone Digital Service offers you end-to-end, full duplex transmission of data at synchronous speeds of 2400, 4800, 9600 and 56,000 bits per second.

**You save because:** More economical digital service units replace modems. Digital transmission improves error-free

## Head-Cleaning Supplies Offered by Kybe Corp.

WALTHAM, Mass. — Kybe Corp. has expanded its data processing and word processing supplies line with the introduction of several products for cleaning heads and associated transport hardware:

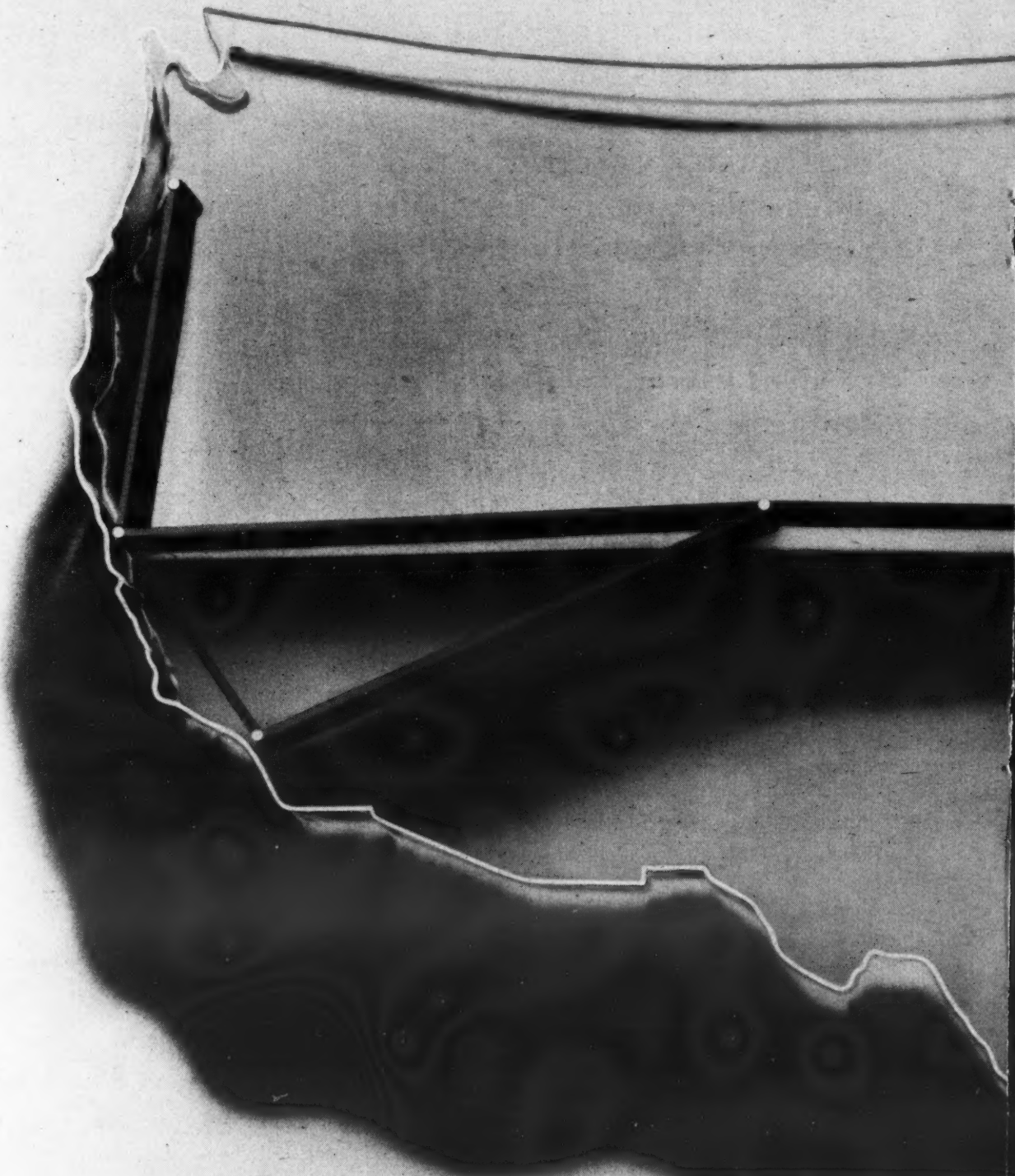
- A magnetic head cleaner, a formulation of trichloro trifluoroethane solvent and liquid fluorinated hydrocarbon propellant, is said to remove the contaminants but is harmless to plastic, rubber, tape and painted surfaces. Price for three 16-oz. containers is \$9.95 to \$12.75.

- A power duster, a highly compressed neutral gas, is capable of being released in controlled amounts for dusting components. Price for three 16-oz. containers is \$6 to \$8.25.

- Cleaning materials, urethane swabs and wiping cloths, remove debris without scratching or leaving film on magnetic head surfaces. Price for 100 cloths is \$4.50 to \$5.75. Price for 50 swabs is \$5.50 to \$6.50.

- A magnetic head cleaning kit, which consists of a head cleaner, swabs and cloths, ranges in price from \$15.50 to \$17.50.

The firm is at 132 Calvary St., 02154.





## Key-to-Disk System More Than a Fringe Benefit

LOS ANGELES — Southwest Administrators, a professional fringe-benefit administrator, is using a key-to-disk data entry system to handle a diverse workload for nearly 300,000 union members in the Western Conference of the International Brotherhood of Teamsters.

Paul Becker, DP manager of Southwest Administrators, which specializes in health and welfare trust fund accounting, said his 22 keystations are providing "very high productivity" in the preparation of data.

"The 22 keystation operators who work on our two shifts average 13,000 keystrokes an hour each during a normal work week, which is a very high average," Becker said.

"One operator consistently enters data at 21,000 keystrokes an hour," he added.

Becker said the primary functions of Southwest Administrators are to bill participating employers and to maintain eligibility records and medical claims history files for members of the 26 local union trust funds that make up the Teamsters' Western Conference.

The conference covers Southern California, southwest Nevada and part of Arizona.

In addition, Becker said, the company processes insurance claims, including writing checks for payment to hospitals, doctors, dentists, pharmacies and

individual members.

Claims paid in 1974 totaled about \$50 million and included more than 225,000 individual claims for medical benefits, about 150,000 for dental benefits, about 400,000 for prescriptions and about 60,000 for vision and eye benefits.

"That's a lot of paperwork, and it all goes through the Entrex 480 data entry system," Becker said.

"We're very pleased with the system since its installation in June 1973. We converted our data entry work from a competitive key-to-disk system at that time."

Becker said data is processed by a Burroughs 3740 computer system.

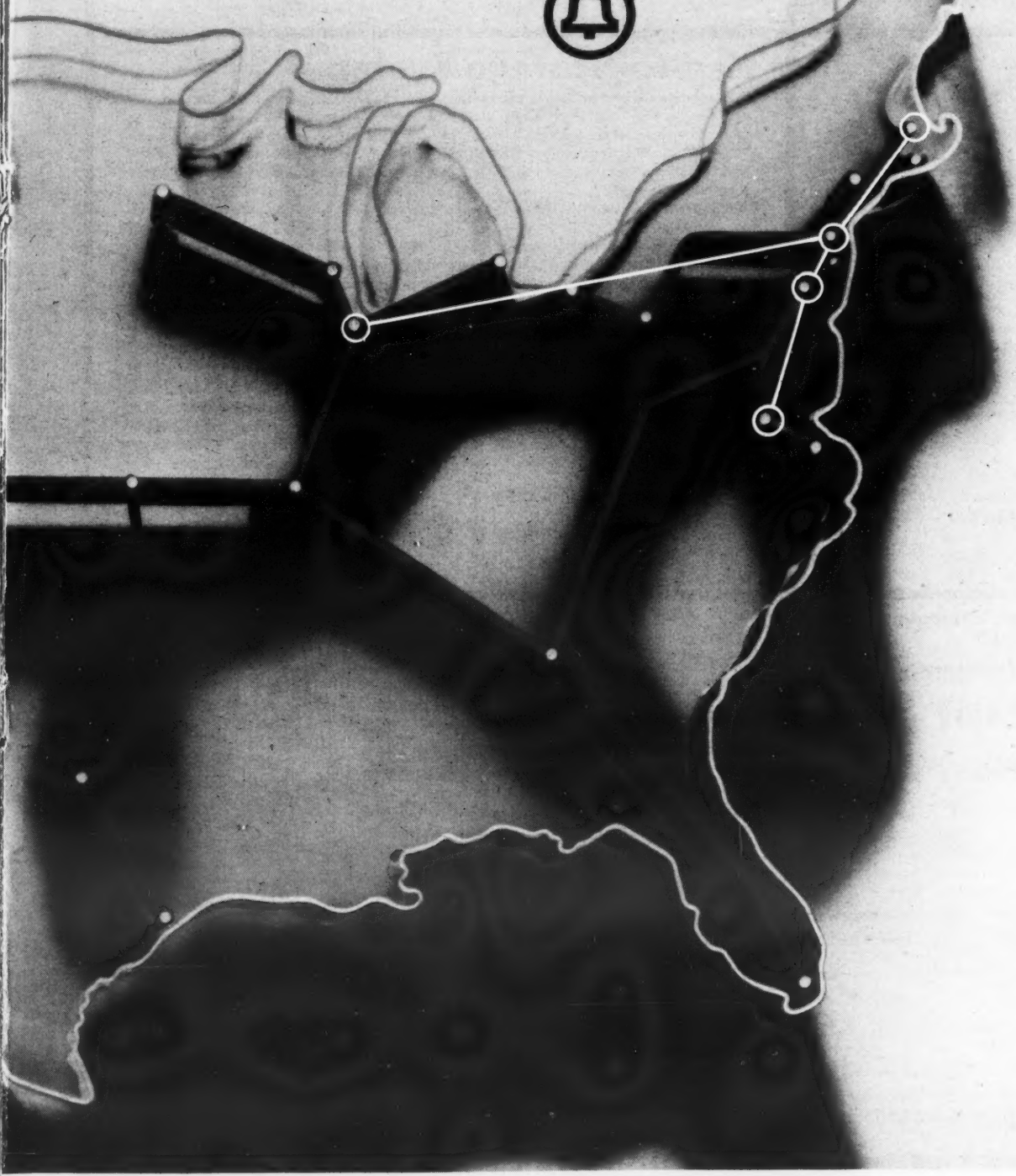
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## Cardkey Offers Access Control For Keyboards

CHATSWORTH, Calif. — Multiple levels of security — each level requiring a higher degree of confidential information for access than the one below it — are provided by the Interrogator series of electronic keyboard access control systems from Cardkey Systems.

Available in on-line and off-line configurations, the solid-state Interrogators I, II and III systems each have a 10,000 code combination capacity, thumbwheel switches for reprogramming of keyboard codes, tamper-proof controls, incorrect code alarm and other features, the firm said.

### Error Annunciator

Interrogator systems are upgradable and interface with a range of data equipment. They can be equipped with an error annunciator which triggers an alarm if a preset number of incorrect push-button codes are exceeded.

A special duress function, optional on Interrogators I and II, allows an authorized user to signal a remote audio or visual alarm if entry is being forced.

### Credentials Required

Two credentials — a common memorized code and a Cardkey Securicard — are required to activate the Interrogator II, typically used in computer rooms.

In both off-line and on-line configurations, the system can be switched to a "card-only" mode at busy times or in heavily trafficked areas.

Prices start at \$11,500 for a 16-door system with up 1,000 cards. The firm is at 20339 Nordhoff St., 91311.

## Itel Group Installs First 7330-11 Device

SAN FRANCISCO — Itel Data Products Group has installed its first 200M byte/spindle disk storage product, the 7330 Model 11.

The first of these subsystems is said to be successfully operating at Dataminder Corp. in San Diego. Dataminder is a bank services operation and a subsidiary of Southern California First National Bank.

Two 7330-11 files are intermixed with 30 7330-1 files and connected through four Itel 7833 control units to an IBM 370/155 at the San Diego concern.

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We've selected leading experts from around the country to give seminars on some of the most important topics on today's EDP scene. These seminars are current, practically oriented, and packed with detailed information. They will help you save time and money. And they can give you the information you need to increase your installation's efficiency. In an increasingly complex and fast-changing EDP world, these seminars are even more important to your company, your installation, and you. Here is our current seminar schedule:

## Data Communications

### Course #1010—

#### Practical Data Communications Systems and Concepts

This course will give you the information you need to master the newest developments in Data Communications. Led by the nationally recognized teleprocessing consultant, Dr. Dixon Doll, the course covers recent changes in areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers. This seminar runs two days, and total cost, including workbook, reference materials, luncheons and continental breakfasts is \$350. Additional registrants from the same company qualify for a reduced rate of \$300. Current schedule is as follows:

Orlando—Jul. 2-3

### Course #1020—

#### Advanced Teleprocessing Systems Analysis and Design

This course is a follow-up to Course #1010, with special emphasis on problem solving techniques for minimizing operating costs in commercial data communications networks. Also led by Dr. Dixon Doll, the course covers procedures, approaches and algorithms for evaluating and cost-optimizing network organizations.

This seminar runs three days, and total cost, including an extensive set of customized course materials, luncheons and continental breakfasts is \$450. Additional registrants from the same company qualify for a reduced rate of \$400. Current schedule is as follows:

Los Angeles—Jun. 16-18

## Data Base Design

A practical approach to the design, implementation, and maintenance of data base systems.

Effective data base system design requires both a complete knowledge of the facilities provided by a data base package, and a basic understanding of the mechanisms which can be employed to construct data base systems. In fact, the former is of questionable value without the latter.

This course is a package independent examination of the techniques required for the design of effective data base systems. The topics covered include:

- Effective Record Design
- Physical Storage Techniques
- Optimum File Organization and Indexing Techniques
- File Integration
- and much more

Given in association with Leo J. Cohen and Performance Development Corporation, this course reinforces the lecture material with workshops, in which attendees apply the techniques, just learned, to practical problems.

You should attend this seminar if you are (or will be) involved in the design and/or implementation of a data base system and whether as a Data Base Designer, Planner or Analyst.

This course runs for 3 days and costs \$350, including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of \$300. Current schedule:

New York  
Denver

September 22 - 24  
December 1 - 3

## How to draft effective legal agreements

### A one-day workshop for non-legal, technical people.

Because companies want to save legal fees - or because they do not think they can find a lawyer who understands their industry - they often have non-legal technical people draft agreements. This is done both by suppliers and users in the computer industry, and the resulting agreements are used both for specific transactions and as "standard forms". In either case, there can be significant problems. It is easy to overlook important legal points, and the results of such omissions can often be very damaging.

This comprehensive one-day workshop on the drafting of effective legal agreements will give you the basic skills necessary to write better legal agreements and to spot items that really require the attention of lawyers.

Our workshop leader is Roy N. Freed, the nationally recognized expert and author in the field of computer law. Mr. Freed will conduct the workshop with a great deal of interaction among participants, and all participants will receive a complete workbook on the subject.

The cost for this one-day workshop is \$135., including course materials and luncheon.

Current Schedule:

New York                      October 8  
Boston                         October 15

## Key-to-Storage Systems

### How to evaluate and optimize the various successors to keypunch equipment.

Data entry is a big problem - and a big headache - as every computer user knows. It is therefore a prime target for cost savings. This course is designed to help you in the practical aspects of selecting, installing, and making the best use of keyboard-to-storage systems. It is an expansion and an update of our successful key-disk seminar. Under discussion (including some user case studies) will be:

- Introduction to data entry concepts (keypunch, buffered keypunch, keypunch, key-disk and beyond . . .)
- Key-disk hardware and software
- Evaluating . . . and starting . . . key-disk systems
- Selecting and operating intelligent terminals, both key-to-cassette and key-to-floppy disk
- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is \$350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only \$300.

Chicago                      Hyatt Regency O'Hare                      June 9-11

To: Ed Bride, Vice President, Editorial Services, Computerworld  
797 Washington Street, Newton, Mass. 02160

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## Mini Bits

### Internal, External Memory Units Turn Calculator Into Small System

LOS ANGELES — Compucorp has developed extended internal and external memory systems for the Monroe 1800 and Compucorp 400 series programmable calculators. Addition of the memories to existing calculators puts them in the small computer system category, Compucorp said.

The internal memory development uses 4K random-access memories (RAM) to package 8K bytes of memory into the Monroe 1800/Compucorp 400 series. The external memory interfaces up to four floppy disk drives.

A Disk Operating System is said to be a complete file management system that allows the programmer to talk to the disk in terms of files and records and to access records based on numeric or alphanumeric keys. The operating system also contains standard utility routines such as sort and list, the firm said.

The price of the Model 491 dual disk memory is \$6,000. The Model 88 8K internal memory is \$3,750.

The firm is at 12401 W. Olympic Blvd., 90064.

### Functional Keyboard Fits PDP-11

TROY, Mich. — System Associates has announced a computer-controlled function button keyboard. The device has an interface for Digital Equipment Corp.'s PDP-11.

It has 32 buttons which can be lit by the PDP-11. When the buttons are lit, they are enabled for operator selection.

The device has a photosensor to enable the computer to sense

up to eight different overlays that are used to vary the meaning of the buttons.

The product is "ideal for graphic applications involving DEC's line of graphic terminals such as the GT40, GT42 and GT44," according to the firm.

Purchase price is \$2,500. The firm is located at 55 Park St., 48084.

### GIC Adds Random-Access Memories

HAWTHORNE, Calif. — General Instrument Corp. (GIC) has three random-access disk memories which include the 530M military version of the Model 530 series and two versions of the company's 500 series.

Designed for rugged use, the 530M is available with up to 80M bits on a maximum of 1,024 data tracks and sells for \$65,000.

The Series 500 models are designated the 500HM and 500MPM. They have up to 18M bits of storage on a maximum of

256 data tracks, available in 16-track increments.

The 500HM incorporates a recording technique which allows higher recording density.

The 500MPM is the modified-phase version. Features of both versions include implementation of head sparing, wider margins on frequency and voltages and a higher bit-packing density. They range in price from \$3,800 to \$9,000.

The firm is at 13040 South Cerise Ave. 90250.

### TCP-1000 Replaces DEC TA-11

PHOENIX — The TCP-100 tape cartridge peripheral from Three Phoenix Co. uses a DC300A tape cartridge and is said to directly replace the Digital Equipment Corp. TA-11 cassette tape system.

It features up to 20.5M bytes

of on-line storage with one to eight drives per controller, a 6 kbit/sec transfer rate and 120 in./sec independent rewind.

Priced at \$3,195 for the main controller with drive, the unit is available from the firm at 10632 North 21st Ave., 85029.

## Datapoint Business System Has Support for 16 Remote Stations

SAN ANTONIO, Texas — Datapoint Corp. has an expanded Datashare system which is said to offer a total business data processing capability for small and medium businesses and for field offices of larger companies.

The system is based on Datashare III, an expanded version of the original Datashare software package, the 64K Datapoint 5500 Advanced Business Processor which can provide computer power to 16 user terminals and the Datastation 3600 user terminal with its terminal printer, the firm said.

Peripherals which can be attached include up to eight 24M-character disk drives or, alternatively, up to four 2.4M-character cartridge disk units, a 300 line/min drum printer, a 120 line/min belt printer, a 30 char./sec servo printer, 7- and 9-channel magnetic 800- and 1,600 bit/in. tape drives and a variety of communications interfaces.

Users can access the system through the Datastation 3600 user terminal, a CRT terminal unit designed specifically for use as a satellite workstation in a Datashare configuration. The terminal can be equipped with an impact printer.

The 3600 has 24-line by 80-character screen display, standard typewriter, 10-key numeric keyboard and upper and lower case display capability.

Datashare III, the latest version of the firm's master control program, allows access to the CPU by up to 16 remote or local workstations using any mix of Datapoint 3600s, 1100s, 3360s or other teletypewriter-compatible user terminals.

The software is said to provide true indexed sequential file-handling capability, enabling users at remote workstations to add, merge, delete, append, sort and otherwise extract useful information and analyses from files maintained on the disk storage media associated with the central processor, the company said.

For processing jobs which require access to large mainframe

computers, the Datashare-controlled network of remote workstations and disk and tape storage units also serves as a means of pooling and then transmitting data to a central computer over standard telephone connections.

Remote workstations can be connected by common twisted-pair wires or they may be connected through standard telephone connections.

A Datashare system incorporating a 5500, 48M bytes of disk storage and a 300 line/min printer, with 16 remote workstations, has a two-year monthly lease cost of \$212 per terminal including maintenance.

Datapoint is at 9725 Datapoint Drive, 78284.

### IBM Links 3340 With System/7

ATLANTA — IBM has interfaced its 3340 disk drive to its System/7. The enhancement is directed toward users with large-volume storage or high-speed access requirements.

Up to 34.2M words can be stored on each 3348 module. With minor programming modifications, a current System/7 user will be able to utilize each 3340 file to emulate up to 12 5022s — the smaller disk drive for the System/7.

An access method called Native Direct Access Method 7 will also be available, IBM said.

Through its use, data recorded on the 3348 will be interchangeable with System 370s running under OS/VS and DOS/VS, the company said.

In a minimum configuration, the System/7 with a 3340, including the 3340 attachment feature, can be rented for a monthly charge of \$4,220 or purchased for \$148,305. First customer shipments are scheduled a year from now.

### Can Use Satellite Data

## System 101 Monitors Nations' Resources

MOUNTAIN VIEW, Calif. — Stanford Technology Corp. has developed a minicomputer-based system that provides both domestic organizations and the governments of emerging nations with the means to develop a complete picture of the resources of the land in agriculture, geology and forestry.

The system, known as the I<sup>2</sup>S System 101, is capable of taking data from a number of sources, including the National Aeronautics Space Administration's Landsat satellite system and airborne multispectral scanners.

It can then reduce the data into digital form for hard copy, transform it into color images on a television screen or highlight particular features of interest on request.

The system is also capable of taking two or more relatively contiguous maps and joining them in a one-to-one point overlay.

According to John Adams, software programming director for the System 101, "the system and the satellite-based data it manipulates will enable a developing country, at a comparatively low cost, to effectively monitor and manage its physical resources to meet present demands and future expectations."

"Domestic companies, like wood products firms and large agricultural companies, can use

the system along with government agencies to continuously monitor changes in climate, weather, erosion and crop growth patterns."

The System 101 uses a Hewlett-Packard HP 3000 with 64K memory. A smaller system, based on a HP 21MX with 32K memory, is also offered.

Both systems utilize Stanford Technology Model 70 user consoles, which contain special-purpose processing logic, operator controls, solid-state memory for retaining images and a color television tube for display.

### Fixed-Head Disk Memory Series Features Access Time of 4.2 Msec

CHATSWORTH, Calif. — A series of fixed-head magnetic disk memories with access times as fast as 4.2 msec and capacities as high as 40M bits is available from Alpha Data, Inc.

The memories are plug-compatible with most minicomputers including Data General's Nova 2, 800, 830, 840, 1200, the Super Nova and Eclipse series; Digital Computer Controls' DCC116; Digital Equipment Corp.'s PDP-8, PDP-11 and PDP-12; and Interdata's 70, 74, 80, 7/16, 7/32, 8/32, 80 and 85.

The 10/16 series is designed with a fail-safe head-lifting

mechanism which eliminates head contact and minimizes "crashes," the firm claimed. Disk and heads are contained in a sealed, nonpressurized enclosure.

There are models in the series with capacities ranging from 1M bits to 40M bits, access time ranging from 4.2 msec to 16.8 msec and quantity of tracks ranging from 16 to 384. Multiple parallel channel capability is available as an option.

Prices start at \$2,000 from the firm at 20750 Marilla St., 91311.



## 9-Track, 75 In./Sec DEC Tape Subsystem Fits PDP-11 Family

MAYNARD, Mass. — Digital Equipment Corp. has introduced 9-track, 75 in./sec magnetic tape subsystems for its PDP-11 family of computers.

Available in different configurations for PDP-11/70 and other PDP-11 family computers, the units feature a data density of 800 bit/in. NRZI and 1,600 bit/in. phase-encoded.

### Handles Eight Drives

Up to eight tape drives can be tied to each subsystem controller. Called the TWU45 for PDP-11/70 computers and the TJU45 for other PDP-11 computers, both subsystems are priced at \$26,500 for the first unit and \$14,000 each for additional tape drives. Quantity discounts of controller/tape drive combinations are available, with first deliveries scheduled in



DEC Magnetic Tape Subsystem

July.

The tape units employ a vacuum column for tape buffering and tension control. A servo-controlled single capstan and vacuum-type tape cleaner are utilized.

Additional features include dual-gap, read-after-write magnetic head, data checking, error correction for a single track dropout, a transfer rate of 120K char./sec and a rewind speed of 250 in./sec.

## Fabri-Tek Unit Expands Memory Of DEC PDP-11s to 124K Words

MINNEAPOLIS — Fabri-Tek, Inc. has an Extended Addressing Option for the Digital Equipment Corp. PDP-11 series of minicomputers. This unit allows the main memory of a PDP-11 system to be expanded from the standard addressable 28K words to 124K words.

Two versions of the Extended Addressing Option are available. The first is for PDP-11/05 and 11/10 computers and is contained on a single printed circuit card. The second, for the 11/15 and 11/20 models, is contained on two cards (one module).

Both units plug directly into the PDP-11 mainframe, the firm said.

Price of the unit is \$600 when purchased with any size Fabri-Tek Model 11 add-on core memory system.

The Extended Addressing Option allows

additional memory expansion to 124K words by interrupting address bits 13 through 15 from the processor, using these bits to select one of eight 5-bit page registers in the Address Extension Unit.

The contents of that register (allocated then as address bits 13-17) along with the original 4K words (bits  $2^1$  through  $2^{12}$ ) are taken from the processor, placing the resultant address onto the Unibus.

Processor address bits 16 and 17 are ignored by the Address Extension unit. The result is a mapping of any 4K word page of the 124K address space into the originally assigned 28K-word processor address space.

By selecting assigned I/O addresses, each page register can be accessed to allow address data to be changed.

The firm is at 5901 S. County Road 18, 55435.

## Varian-Based System Simulates Airports On Color Displays

ST. CHARLES, Mo. — A pilot-training simulation device uses a mini to create visual scenes that can depict the pilot's view of the airport more realistically than ever before.

The system allows any airport to be represented on a color CRT display and be continuously updated, in real time, as the plane's position changes.

Called Virtual Image Takeoff and Landing (Vital), the system utilizes a Varian Data Machines V73 computer to generate light pattern displays which look like the airport and its immediate surroundings at night.

Pilots simulate flying anywhere within a 600-mile radius on an airport with an accurate perspective regardless of attitude, position, heading or altitude. Each pilot action dynamically affects the airport scene.

John W. Watson, program manager of visual simulation for McDonnell Douglas Electronics Co., which has developed the visual simulation system, said the scene displayed to the trainee and instructor details the runways, including airport and runway lights, runway surfaces, paint markings and identifier numerals.

The lights of the surrounding city are also shown, including major thoroughfares, shopping centers and radio towers. The horizon is represented as a glowing band.

All the lights adjust to reflect visibility conditions. The intensity of each light as seen by the pilot is individually computed according to its apparent distance away.

## Algorex Adds Station For Graphics Display

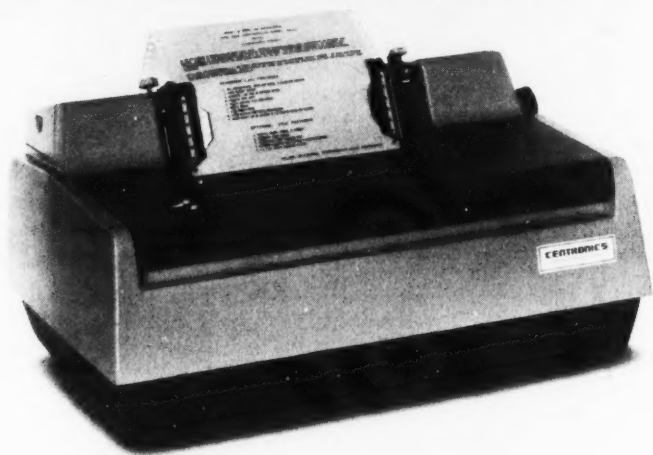
SYOSSET, N.Y. — Algorex Data Corp.'s Model 1110 interactive graphic display station was designed to operate with any Data General computer system.

The 1110 is said to provide selective erase of any portion of the display. The CRT is a 21-in., high-resolution tube with either a black on white or white on black picture.

The 1110 is supplied with the Algorex RDOS-compatible Computer-Aided Digitizing, Drafting and Design (CAD<sup>3</sup>) application software. This software package supplies the capability to enter drawings into the computer data base, edits existing designs by shape manipulation and adds drawing information utilizing a library file, the firm said.

The 1110 sells for \$32,500 from the firm at 6901 Jericho Tnpk., 11791.

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Model 306C prints  
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**Centronics Of Puerto Rico, Inc.:**

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**Centronics International Corp.:** Brussels, Belgium 02-762-3572/3

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## Mini Bits

### Data Collection Device Functions as Calculator

DALLAS — Computer Development has designed a data collection unit known as the Add Punch Replacement 100 (APR-100). The unit contains an electronic keyboard with full arithmetic features, nonadd functions, hard-copy printout for sight verification and records on a magnetic reusable Philips cassette in excess of 100K characters.

If data collection is not required, the unit will function as a hard-copy calculator. With its RS-232 interface, its format is compatible with any other RS-232 device, the firm said.

Future options will be telecommunications at various rates from 300 bit/in. to 2400 bit/in. The unit is priced at \$1,900 from the firm at 13500 Midway Road, Suite 208, 75240.

### DEC Delivers PDP-11/70

MAYNARD, Mass. — Digital Equipment Corp. has delivered its first PDP-11/70 system to Bell Telephone Laboratories. The system, valued at \$168,000, has been delivered to Bell's Whippany, N.J., laboratory.

The PDP-11/70 will be used in the development of a main distributing frame, interfacing equipment between customer telephone lines and telephone company switching equipment.

The system includes an 11/70 CPU with 128K of memory, two disk and tape drives, a communications multiplexer, a synchronous line interface and high-speed paper tape reader.

### Tycom Adds Adapter

FAIRFIELD, N.J. — An interface adapter from Tycom Systems Corp. is said to offer greater flexibility for users of the Hewlett-Packard 9800, Monroe 1800 and Canon SX-310 programmable calculators. With the Tycom 301 interface, these calculators can be adapted to such peripherals as CRT displays and magnetic tape cassettes by means of an integral RS-232 connector.

The interface adapter is priced between \$595 and \$895 from the firm at 26 Just Road, 07006.

### BAI Develops Tape Reader

CHERRY HILL, N.J. — BAI has introduced its Econoread 150 photoelectric tape reader that will read any standard 8-level, 1-in. tape including paper, mylar, aluminum and aluminum mylar without adjustments.

The light source is a standard long-line filament lamp similar to that found in a Volkswagen, derated from 12 volts to 8 volts and assuring over 10,000 hours of life, the firm said.

The bidirectional reader uses a stepping motor drive that stops on character at 150 char./sec. One circuit card provides compatibility for DTL, TTL or CMOS compatibility.

The price of the reader with complete electronics is \$199 from the firm, which can be reached through P.O. Box 681, 08003.

## Gen-Com Adds 30 Char./Sec Printer

LOS ANGELES — Gen-Com Systems' Model 9000 receive-only printer offers a 30 char./sec speed for attachment directly to a CRT or a minicomputer.

The Model 9000 printer is based on the Qume Daisy-Wheel printing mechanism and an Intel 8008 microprocessor controller. There is only one logic interface card, which contains the Intel 8008 microprocessor chip and a standard EIA-compatible RS-232 connector.

The printer accepts standard 14-7/8-in. computer paper or smaller and is adjustable for up to six-part paper. Forms trac-

tors, pin-feed platens and split platens may be added.

Daisy Wheels are interchangeable and are available in a variety of type fonts.

The 9000 printer can increase throughput by printing backwards. This requires alternate print lines to be transmitted in reverse order. With backward printing, delays associated with carriage returns are not needed, the firm said.

Throughput of the Gen-Com printer can be further increased because it has a 64-character first in/first out receive buffer, and because, for an "average"

mix of characters, it can print faster than 30 char./sec.

### Graphics Mode

A feature standard on all Model 9000 printers is the Graphics Mode. In this mode, horizontal movement right or left can be varied from 1/120 of an inch to 95/120 of an inch with special commands.

Configured in a low-profile stand, the printer is priced at \$3,100 purchase or \$130/mo lease including service.

The firm is at 2306 Cotner Ave., 90064.

### More Card Links

MINNEAPOLIS — The Custom Systems card reader interface line has been expanded to include Series 190 controllers designed to couple Documentation or Peripheral Dynamics card readers with several minicomputers.

Series 190 boards can interface the readers with either Data General Nova or Digital Equipment Corp. PDP-8/E minicomputers, the firm said.

The unit is priced at \$975 from the firm at 4935 Boone Ave. North, 55428.

## Silent 700 ASR Data Terminals eliminate paper tape problems



**with magnetic tape convenience and real cost-saving features...at an affordable \$2750**

### Reduce operating cost

*Silent 700\** ASR Electronic Data Terminals are designed to reduce operating costs. Compared to paper tape, the magnetic tape cassettes used in *Silent 700* ASR data terminals are faster, easier to handle, easier to edit, and easier to file.

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### Reduce expansion cost

Additionally, *Silent 700* ASR terminals can reduce your system expansion costs. Their modular design allows you to enhance terminal performance as system requirements grow.

Many options are available for this purpose... such as built-in acoustic couplers and modems, 1200 Baud transmission, automatic answer and answer-back memory and automatic search of cassette control functions.

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*Silent 700* ASR data terminals are so reliable that you can virtually eliminate over-time work requirements caused by terminal downtime. How? The key factors are solid-state reliability backed by electronic integrated

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So, if you're concerned with improving the data handling operations of your firm... regardless of whether they involve point-to-point communications networks, data entry, or timesharing... TI can offer an affordable answer.

For more information on how the *Silent 700* ASR terminals can reduce your operating costs, call the nearest sales office listed below. Or, write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001.

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## Automated Accounting System Helps Manufacturer Keep Pace

KANSAS CITY, Kan. — A company that has grown 400% in eight years has turned to a small computer to manage growth and maintain the small-company efficiencies which helped it grow.

Fashion, Inc., a division of the LCA Corp., uses its NCR Century 50 for a variety of accounting and management functions. Soon, said John McGreery, executive vice-president and general manager, "we will begin using it for production control and materials requirement planning."

Fashion is a 28-year-old designer/manufacturer of special roll-formed metal awning, canopy, carport, patio, mansard and walkway cover systems.

"Prior to 1968," McGreery said, "we were an entirely manual bookkeeping and recordkeeping business. Then we installed

an NCR 33 accounting machine and were able to improve service to ourselves and our customers for a time.

"But growth soon overtook us again and, despite the addition of a second NCR 33, we were unable to keep pace," he recalled.

### System Paid for Itself

"We felt that, although we had grown, we were too small for a computer system," according to Joye Hill the company's controller. "But, in discussing our needs with representatives of NCR and other companies, we found we could justify half the cost of the Century 50 with accounting tasks alone and more than pay for it as we added manufacturing jobs."

In its first six months' operation, the



Joye Hill and Kurt Erickson supervise the use of the Century card reader at Fashion, Inc.

system has taken over payroll preparation, mailing list analysis and compilation, accounts receivable and inventory control.

"We had our programs developed and

tailored to our needs before the system was actually installed in November 1973," Hill said. "When it arrived, we were ready to handle the 140 to 150-man payroll and the 10,000 prospect and customer names and addresses we keep on file."

"Although we pride ourselves in our reputation for fast, dependable service," McGreery noted, "we have never developed a perpetual inventory or cost accounting system. But those days are over. And the computer has helped upgrade our management skills by providing us with a central source for information on multiplant, multistate operations."

### Aids Industry Control

"In the case of inventory, especially," Hill added, "we have found that the actual time and labor involved in taking physical counts is minimal. After all, our operations involve processing rolled aluminum or steel stock, precoated with the color and finish we select, and roll-forming it into the components used in service station canopies, carports, building facades and a host of other products."

"We maintain no finished goods inventory, making to order every item in our product line of more than 300 items. But, we must have accurate inventory information if we are ever to develop what will be a major payoff application for us — material requirements management."

"So, we have taken physical inventory information from our three plants, entered it into the computer, programmed it to extend and total inventory figures automatically and sent to our production supervisors the inventories we know are accurate," she said.

She said Fashion now merely adds receipts from records gathered for accounts payable, updates inventory files accordingly and decrements them when monthly or bimonthly physical count information becomes available.

### System Growing

Before year's end, Fashion will have sales analysis, general ledger and accounts payable fully automated on the Century 50. "The benefits we've enjoyed thus far should be multiplied when the majority of our recordkeeping functions are in machine-usable form," McGreery said.

"We have approached the sequencing of jobs so that we have had a minimum number of thorny problems, but yet have kept growing the system so that the computer does the laborious, manual functions and our staff is freed for more creative assignments."

His own pet project for the future, he said, involves developing an integrated requirements and production system.

"With the type of business we are," McGreery explained, "with the vast amount of customer fabrication and design work we have, the small computer is a great solution. We soon will extend it to the operations area by analyzing orders, production and material requirements faster and more thoroughly with the system than we could do ourselves."

"That will mean a savings of days, or even weeks, in delivering finished goods."

## Little things that count.

Read all about them in our June 25th supplement, "Minicomputers and Small Systems."

Minicomputers are getting bigger and smaller than ever these days, and they are subject of a special report in the June 25th issue of *Computerworld*. Edited by Vic Farmer, this special supplement will focus on problems and solutions in minicomputer applications and system integration. Drawing on the real-world experience of other users in situations like your own, special emphasis will be given to money-saving ideas. You'll see application stories and tutorials on topics like these:

- The benefits and drawbacks of time sharing on a large system versus owning a small minicomputer system.
- How to recognize and solve problems in interfacing and system integration.
- When to call for help - minicomputer consultants and outside software packages.
- Satellite system networks - minicomputers as processors in data networks.

If you're using minicomputers or are considering one, you should be reading this special report in the June 25th issue of *Computerworld*. And if you're a marketer in the minicomputer industry, your ad should be there. Ad closing is June 6th. For complete details, contact your area *Computerworld* representative. Or call Judy Milford or Sara Steets at (617) 965-5800.



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## CI Notes

### New Division Emerges

## IBM Realigns, Spotlights Communications

### Commerce OKs 1106 to USSR

WASHINGTON, D.C. — The Commerce Department has approved the issuance of an export license to Univac for an 1106-II multiprocessor system to be used in a reservations system for Aeroflot, the Soviet airline.

Univac's \$10 million contract with Aeroflot includes the 1106-II and specialized software developed by Air France under a subcontract from Univac.

In another order for equipment to be used by Aeroflot, General Automation will supply SPC-16/85 minicomputers as part of a network being constructed by Compagnie Generale de Construction Telephonique (CGCT).

The French firm is installing the network with five major switching centers in the USSR using its DS6-400 hardware/software modules built around the SPC 16/85s. The modules will handle message-switching tasks as well as allow file interrogation and data base management.

### ICL Selects Division Data

HORSHAM, Pa. — Decision Data Computer Corp. has received a contract from International Computer Limited (ICL) for 80-column data recorders and reader/punches.

The three-year agreement, expected to produce orders in excess of \$6.9 million, is Decision Data's largest European contract, Loren A. Schultz, president, said.

Delivery has already begun. Most equipment is expected to be manufactured by the firm's affiliate in Northern Ireland, International Engineering Ltd.

### Calcomp Supplying GA

ANAHEIM, Calif. — General Automation (GA) has selected California Computer Products, Inc. (Calcomp) to supply it with Trident disk drives and other disk memory products valued at \$2.5 million over the next two years.

### Telex Forms Service Unit

ENCINO, Calif. — Telex Corp. has formed the Telex Service Corp. as a wholly owned subsidiary of Telex Computer Products, Inc.

The new unit, comprised of the former Field Service Division, is designed to expand service into the OEM marketplace, in addition to servicing Telex products.

### Supershort

Control Data Corp. has terminated its OEM agreement with Computer Optics, Inc., supplier of display terminals plug-compatible with IBM 3270s. Computer Optics said it will devote its energies to the end-user market.

ARMONK, N.Y. — IBM has elected to set up a division with responsibility for communications in a sweeping realignment of several divisions.

The move, seen by some industry observers as the second prelude, following the creation of the General Systems Division, to either voluntary divestiture of some units or to a court-ordered split-up, involves a renaming of the System Development Division (SDD) and a reallocation of its functions not related to communications.

The former SDD is now the System Communications Division and is assigned the mission of designing, developing and manufacturing computer-based communications systems and terminal products.

The SDD's task of systems definition was reassigned to the Data Processing Product Group and program development activity was reassigned to the General Products Division, System Products Division, System Communications Division and the Data Processing Product Group staff.

The third function of the SDD, communications, remains as the focus of the newly named division.

Bob O. Evans, formerly president of the SDD, will be president of the System Communications Division.

### 'More Responsive'

"These changes will strengthen the company's focus on the growing importance of communications products and make us more responsive to customer needs," Frank T. Cary, IBM chairman, said.

The Advanced Systems Development Division (ASDD) has been dissolved, with responsibilities assigned to the System

## Bull's Brule Posted To Head New Firm

PARIS — Honeywell and Compagnie des Machines Bull, the new unit to be formed by the merger of Honeywell Bull and Compagnie Internationale pour l'Informatique (CII) [CW, May 21], have indicated they intend to nominate a Honeywell Bull executive as president of the new firm.

Jean-Pierre Brule, candidate for president and director general of the new firm, has been president and director general of Honeywell Bull for three years.

The firms also plan to nominate Robert Gest as general manager. Gest has been general manager of CII since 1972 and was recently named president and director general following the resignation of Michel Barre in protest against the planned merger.

Communications Division, the Data Processing Product Group staff and the Data Processing Marketing Group staff.

The ASDD had responsibility for coordinating worldwide customer requirements, the firm said.

John E. Bertram, formerly ASDD president, has been named vice-president of development and manufacturing in the

System Products Division.

Although the move definitely places increased emphasis on development and manufacturing of communications products, it is unlike the separation of the General Systems Division because it lacks separate marketing capability. Marketing will continue to be performed by the Data Processing Product Group.

## Wyly Gets Respite for Financing, Retracts Offer to Sell Datran

By Molly Upton  
Of the CW Staff

DALLAS — In the latest of a rapid succession of events, Data Transmission Co.'s (Datran) parent, cash-hungry Wyly Corp., has obtained some breathing time to meet its obligations to Walter Haefner Holding AG.

Wyly has admitted it is unable to generate the \$2.4 million needed to complete its \$10 million portion of a \$30 million financing plan for Datran.

The firm has also rejected an offer for the subsidiary and indicated the sale of Datran is no longer an option under consideration.

In a message to stockholders dated April 30, Chairman Sam Wyly listed the sale of a majority interest in Datran, "toward which negotiations are under way," as one alternative should financing be unavailable.

Wyly said it has modified the terms of the original \$30 million financing package with Haefner to relieve it of supplying the remaining \$2.4 million. The deadline for various Wyly obligations to Haefner has been extended from June 13 to Sept. 30.

Wyly is negotiating with Haefner for another \$10 million, which might or might not be in Datran, a spokesman said. That would bring Haefner's investment in Wyly/Datran to \$40 million.

Wyly and Haefner have each provided \$7.6 million in interim loans to Datran pursuant to the original plan, which was to have been proposed for shareholder approval May 30. The shareholder meeting was postponed.

Wyly acknowledged the net effect of several conditions with Haefner for Datran financing is that Haefner "is not obligated to make additional advances or to purchase Datran debentures unless Haefner Holding elects to do so."

"In the event that the proposed financing is not successfully completed, unless additional financing can be arranged, Datran would in all probability... be required to suspend substantially all of its development and con-

struction efforts, which could result in a material adverse effect on the financial condition and operations of Wyly Corp.," the firm said in its annual report.

As security for Wyly's guarantee of the Datran interim note now due Sept. 30 and its obligation to repurchase the Datran securities owned by Haefner, Wyly pledged the outstanding stock of University Computing Co. and Gulf Group, Inc. (GGI) and, subject to a prior pledge, the stock of GGI's subsidiary, Gulf.

### Repurchase Situation

Chairman Wyly explained in the annual report that, if a repurchase situation occurs, Haefner could require Wyly to repurchase the Datran securities owned by Haefner for cash or a secured sinking fund note.

The repurchase situation could occur if "the proposed Datran financing is not successfully completed or an event of default occurs under the bank credit agreement (which, based upon Gulf's present estimate of underwriting losses, is expected to result in an event of default during 1975) that is not waived or modified."

"Wyly Corp.'s ability to continue operations and/or to retain effective control of its operating subsidiaries would depend upon whether or not Wyly Corp. could arrange extended financing from Haefner Holding or other sources and like financing for any significant amounts that might be outstanding under the bank credit agreement," the firm said.

"Wyly Corp. currently believes obtaining additional financing if unlikely in view of its present financial condition. The ultimate outcome of these matters, which may affect Wyly Corp.'s ability to continue operations, cannot be determined at this time," the firm said in its annual report.

### Exploring Sale of Gulf

Wyly noted that underwriting losses in its Gulf Insurance Co. have weakened the  
(Continued on Page 42)

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## MSI President Says

# Retail Scanning Era Three Years Away

By Nancy French  
Of the CW Staff

COSTA MESA, Calif. — The delays and problems experienced in implementing the Universal Product Code (UPC) and the scanners to read it make today's retail market a prescanning market, with the UPC era still two or three years away, Bill Bowers, president of MSI Data Corp., said in an interview here recently.

"The UPC must be printed on each product at the source to make it practical to use and, even now, not all food processors have applied for it," he explained.

While 80% of the national brands have applied for codes, only about 20% of the products in many stores are coded, and printing problems have made some of the codes unscannable, he said. Consumer objections and the effects of the recession are also factors.

"Not a single production model scanning system is operating in any of the experimental locations," he pointed out. "They're all tweaked-up prototypes."

"Long before UPC is a reality, many stores will need to replace worn cash registers and out-dated portable inventory control equipment and reduce labor costs," Bowers said.

Equipment available to fill this need today includes simple cash registers at one end of the spectrum and scanning equipment at the other, he said.

IBM has also officially acknowledged this three-year prescanning market with the recent introduction of a nonscanning electronic cash register, Bowers pointed out.

### 'Probably the Smallest'

"With sales of \$33 million a year and a sales force numbering only 50 people from coast to coast, MSI is probably the smallest company producing field data entry terminal products for a market that has been and always will be dominated by names like IBM and NCR," Bowers said.

MSI now has 80% of the installed base of portable field data entry devices. Norand and Telxon are the company's principal competitors, sharing 15% of the market. Iomec and a few others share the remaining 5%, he said.

"We've had about 40 different competitors since we started MSI, but most of them have ceased to exist," he said.

### Identifying the Market

MSI has identified more than 510,000 potential field data entry users, of which 35,000, or 7%, now use MSI equipment, Bowers said.

The prescanning era marketplace for field data entry products includes a potential 40,000 supermarkets, a category in which MSI has already installed more than 21,000 assorted units for inventory control and ordering and check-out functions, he said.

Hardware and drug stores together represent a potential 85,000 units; MSI has installed about 6,500 units in this area.

Order entry capability for salesmen who stock retail outlets accounts for potential sales of another 100,000 units, and MSI

## Modcomp Negotiates Contract For Space Shuttle System

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. (Modcomp) has made it into the final round of contract negotiations to provide systems to the National Aeronautics and Space Administration (Nasa) for the forthcoming Space Shuttle program.

The contract, estimated to be worth \$6.7 million, calls for about 105 Modcomp II systems to form a network to process and transmit information as well as control the actual launch.

has garnered only 850 sales in this market area, according to Bowers.

Smaller food stores, which represent a potential 200,000 units, have claimed only 2,600 MSI units, and general retail stores represent a market of 25,000 units, with only 1,200 MSI units sold to date, he said.

MSI's short-term objective will be to identify markets that need to be portable and "get into them," he said.

Other prime targets for MSI's sales force include variety stores, auto parts stores, textile mills, service bureaus, shoe stores, women's apparel shops and paint distributors, for example.

MSI offers battery-powered portable data terminals.

"As for point-of-sale terminals, MSI's Astros point-of-sale data entry terminal

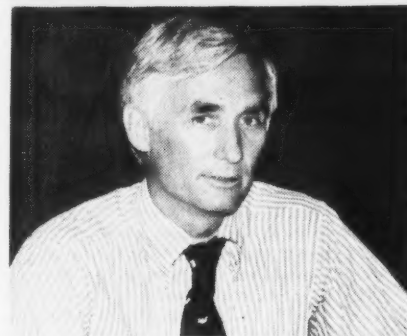
will continue to be sold without a scanner," he said.

"Through an arrangement with Schiller Corp., we will begin to offer a scanner as an option later this year," Bowers said.

Discussing sales strategy, he said "we don't enter a market unless we can show a customer proof of tangible savings, cash control, reduced labor and more throughput."

"We sell the payback scheme as a solution to low profits rather than simply selling faster throughput," he said. Each system will pay for itself in tangible savings in 18 months to two years, Bowers claimed.

The Astros system, with its electronic scales, automatically increases profits for a store because it weighs much more accurately, he said.



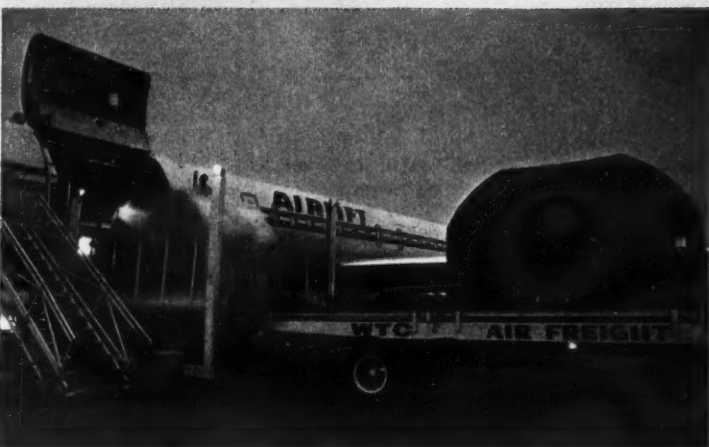
CW Photo by N. French  
Bill Bowers

With old mechanical scales, the customer standing next to the clerk has traditionally gotten the benefit of the doubt. "Now there's no question on the price of produce, for example, he said.

"Astros also helps store management cover peak periods with better scheduling of part-time employees because the system keeps track of checker productivity as well as the number of customers that are processed every hour," he added.

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## Interest of Foreign Buyers Up at NCC

ANAHEIM, Calif. — About 1,000 foreign business representatives, twice as many as last year, registered at an international lounge at the recent National Computer Conference.

The lounge was sponsored by the U.S. Department of Commerce as part of the International Buyers Coordination Program, which matches foreign buyers with domestic firms.

At NCC, the Commerce Department prepared a listing of 91 exhibitors interested in foreign business specifying their products and other pertinent

data. Every effort was made to promote discussion between exhibitors and buyers, a spokesman said.

A list of DP firms interested in contacting foreign buyers visiting the U.S. is maintained by the Commerce Department.

Interested firms can contact

the regional export marketing managers in Atlanta, Boston, Dallas and Philadelphia or Francis J. Caffrey, the western regional coordinator at the U.S. Department of Commerce, Office of Field Operations, 450 Golden Gate Ave., Box 36013, San Francisco, 94102.

## CMC Negotiating Subsidiaries' Sale

MARINA DEL REY, Calif. — Computer Machinery Corp.'s (CMC) new executive team is negotiating the sale of its remaining European subsidiaries in

an effort to reduce corporate debt.

Following the resignation of CMC President Thomas L. Ringer for personal reasons, the firm is being run by an operating committee consisting of John L. Moser, group vice-president, operations; Richard V. Plat, vice-president of finance and treasurer; and Peter F. Zinsli, group vice-president, planning and marketing. A successor for Ringer is being sought.

Under the plan being considered, CMC's subsidiaries in France and Germany would become distributors buying certain components and systems from the U.S. firm and reselling them, according to Plat.

The prospective buyer is purportedly a consortium of European investors that includes affiliates of Computer Machinery Co. Ltd., a former subsidiary headquartered in England.

The proposed transaction would substantially reduce corporate debt and mark a further step in restructuring the company's foreign operations, Plat said.

CMC France S.A. manufactures, markets and services the CMC line of data entry systems. Computer Machinery Deutschland GmbH markets and services systems furnished from the U.S. plant here.

## THE SIX QUESTIONS YOU SHOULD ASK ABOUT SMALL COMPUTERS

Lots of companies have introduced small computers lately. Computers for use in a small office, a lab, a classroom, or a department of a big organization.

Getting a computer is one thing. Getting it to do what you need done is something else.

To get you started on the right foot, here are some tough questions to ask when the computer supplier knocks on your door.

### 1. How much experience have you had in dealing with a small computer user like me?

Few manufacturers have served the small computer market for any length of time. Only they are likely to understand the financial, staffing, expertise and psychological difficulties a small user encounters.

Wang has been building small computers for over five years. We have installed 20,000 commercial, scientific and education computers, and have a record of growth, profitability and dividend payments that few computer companies can match.

### 2. Who is responsible for fixing the computer and its peripherals if they break down?

Check this carefully. Many suppliers use third parties to maintain their equipment. Often, different vendors must be called to fix different parts of the system. This can lead to slow response and finger pointing.

We employ 350 factory-trained field engineers in North America alone. Every one of our people can fix every part of the products we manufacture—quickly and efficiently. It's our responsibility.

Wang Laboratories has a vested interest in the small computer market. The company has shipped over 20,000 computer-based products, valued in excess of \$200 million, in the past five years.



Shown above is a typical small business computer system priced under \$25,000.

### 3. Can I expand my computer hardware once it is installed?

The answer should be "yes." In many cases, you'll find it is "no." No extra storage, no extra peripherals, no faster printing, no extra applications.

Wang's family of computers lets you expand almost everything. Memory can be quadrupled. Auxiliary storage goes from one-quarter million to ten-million characters. You can add over 20 peripherals, including printers, tape drives, card readers, digitizers, plotters, and telecommunication controllers.

### 4. Can I expand the number of jobs I run after the computer is installed?

Here again, the answer should be

"yes." But some suppliers deliver only a specific set of applications software with their hardware. That limits the number of jobs—and even the way in which you do them—to what the supplier offers.

Wang believes every user should be free to custom-design his applications, at the start, and as his needs change. We provide hardware designed to grow and a language that is easy to use and simple to get up and running.

### 5. Is the system designed to handle my business as well as technical and engineering processing?

With most suppliers you get one or the other, rarely both.

Wang's small computer system is designed to do both complex mathematical functions and business file-oriented transactions. This combined capability enables you to solve more problems on one system.

### 6. How much should all of this cost?

Not much. Even when you include everything—hardware, programming, maintenance, training and routine service—your first computer has never been a better buy than it is today.

And we think Wang offers you the best buy. For example, our prices

average 20-30 per cent lower than some of the newest products on the market.

Wang's computer family spans a price range from \$5,400 to over \$40,000. It includes many processors, a complete line of peripheral devices, teleprocessing and work station capabilities.

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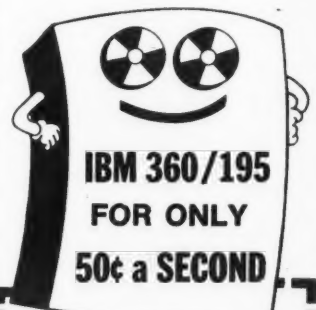
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## Beamos Features Access Time 1,000 Times Faster Than Disk

SCHENECTADY, N.Y. — General Electric Co.'s (GE) Research and Development Center has developed a nonvolatile memory with access times said to be up to 1,000 times faster than rotating magnetic memories.

Called Beam-addressed metal oxide semiconductor (Beamos), the unit is designed for military application but is expected to be marketed for commercial systems as well.

A 32M-bit unit has an access time of 30  $\mu$ sec and a transfer rate of 10M bit/sec.

"The development of this fast, all-electronic auxiliary memory may be as significant as the introduction of the magnetic disk itself," said Dr. Arthur M. Bueche, GE vice-president for research and development.

"Its impact on the operation and architecture of computer systems will be far reaching and is expected to result in substantial reductions in hardware and software costs," he added.

### Costs Lower

Costs are projected to be lower than for other memory technologies. The commercial OEM price of a 32M-bit Beamos is estimated to be in the range of .02 cent/bit to .1 cent/bit.

Beamos uses a "matrix electron lens" with 289 lenslets that direct a cathode ray beam to read, write or erase at precise memory sites on four small, unstructured silicon storage chips that each have a capacity of 8M bits.

In a computer memory system, 16 or more Beamos modules could be linked to provide 500M bit of memory. This system could be accessed in parallel to provide data transfer rates of 160M bit/sec,

the firm said.

Developmental versions of the Beamos modules are being made by the firm's Microwave and Imaging Devices Product Section in Syracuse, N.Y.

## Disks Unchallenged By New Technologies

PALO ALTO, Calif. — Recent developments in mass storage technology will not replace the magnetic disk for direct access storage for a long time to come, because none has improved performance enough to warrant higher prices or offer equal performance for less.

This thesis was put forth by Michael S. Shebanow, division vice-president of engineering for Pertec Corp.'s Peripheral Equipment Division, at a seminar here.

Reviewing mass storage technologies such as ferro-electric devices, cryotrons, switchable resistance, flat and coupled films, plated wires and optical mass memories, Shebanow pointed out none has been very successful.

"One of the most difficult lessons to be learned is that established technologies do not die easily or quickly. To be successful, a new technology has to provide substantial improvement in performance at the same price or be able to offer equal performance at a reduced price," Shebanow said.

"I believe it's very unlikely a cost-effective, solid-state device, as a direct replacement for head-per-track devices, will be available in the next two years. That type of device may be available, but at a higher cost.

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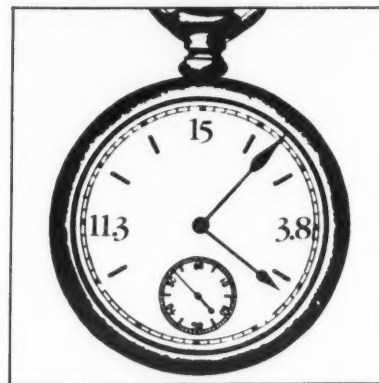
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# Prime President Predicts '75 Orders On Target, Despite Recent Slowdown

By Molly Upton  
Of the CW Staff

FRAMINGHAM, Mass. — Prime Computer, Inc. should be on target during 1975, despite the recently felt slowdown in U.S. orders, acting President Ben F. Robelen told stockholders after the firm's first stockholders meeting.

Although the firm noticed some slowdown in orders from the U.S. in January and February, the U.S. has improved drastically and overseas orders have continued strong throughout, he explained.

Robelen acceded many of the firm's accomplishments were due in part to the decision at the inception of the company to use MOS memory.

Prime has been shipping 32K boards with 4K chips since October, he said, which facilitated the expansion of the current top-of-the-line Model 300 mini to 256K and 31 users.

## New System Coming

Since Prime has always said it is heading toward the upper end of the line, a new model, which will be compatible with the existing line, will be announced this fall, he said.

This will have a new operating system. Other products becoming available include file management capability; 1,600 bit/in. tape; segmentation, which is currently only available on large IBM machines with Isam capability; and an emulator package to interface with IBM equipment for remote job entry purposes. The firm is also working on using disks up to 100M bytes, he said, and plans to introduce its British-developed transaction system, first.

## Productivity Up

Productivity in the manufacturing area has "astounded" Robelen, he said. As of June 30, 1973, the firm employed 28 in manufacturing and shipped about \$800,000 a year, while in March 1975 Prime had 57 people in the department and was shipping what would be \$9 million annualized on the basis of first-quarter shipments.

During April, the firm shipped its 500th computer, and shipments are scheduled at the rate of over 100 systems per quarter.

The sales/employee ratio has risen from \$10,000 to \$55,000, which Robelen called one of the highest in the industry.

Toward the end of the year the firm's gross profit margin was 48%, with an average of 45% for 1974 compared with 29% in 1973, he said.

## System Value Rising

The average prices of systems shipped have been going up, and it is likely that trend will continue, Robelen said.

As an example, the average price of the 300 used to be \$39,000, but now is \$62,000, as customers continue to add features.

The volume of Prime's business in add-on features is increasing and now approaches 25% of quarterly volume, he noted.

Although the 300 accounts for only 30% to 35% of the number of units shipped, it contributes about 45% to 50% of the firm's

revenues.

Prime has selected four markets for its products: time-sharing, communications, data acquisition or process control and business DP, he said. The biggest end-user market currently is time-sharing.

Robelen noted Prime machines are used by Telenet in its linkup with the Arpa network.

The firm is planning to take a hard look at the business DP market, he said, noting it expects to expand its line of proprietary software, including the First package.

About 25% of Prime's business is with OEM and 75% end user, he said.

## Overseas Business

Prime's commitment to be a worldwide company is becoming

evident in the rising proportion of overseas business.

Overseas revenues in 1974 were 37% and rose to 42% in the first quarter of 1975.

The firm is hoping for a 60/40 ratio, he said, but noted the overseas contribution could well be greater than 40%.

Prime's British and German subsidiaries were profitable during the first quarter, he said.

During 1975-76, the firm intends to look at South America, especially Brazil, and the Far East, he said.

Financially, Robelen feels the firm's \$4.5 million line with the First Pennsylvania Bank of Philadelphia should get the firm into 1976, then it will be a matter of discussion. The firm went public in 1974.

# CDC Seen Better Able to Contend With World Economic Uncertainty

MINNEAPOLIS — Control Data Corp. "is in an increasingly better position to contend with future uncertainties in world economic conditions," Chairman William C. Norris told stockholders recently.

Although "there is no way to escape completely the effects of inflation, interest rate changes, availability of capital and monetary instability," CDC anticipates improved profitability in 1975 and beyond, he said.

Norris reiterated that a return to profitability in the computer business would be gradual, with quarterly earnings subject to fluctuations in the purchase-to-lease mix of large computer systems and current start-up costs of the new Cyber 170 line of systems impacting second-quarter results.

Financial services earnings for 1974 "should be above last year," he predicted, "although uncertainties over business and government financing demands as the year progresses could lead to higher interest rates and slower earnings growth in the second half" compared with the first half.

Data services, the leading thrust of the company's business, are showing increased profitability this year as the result of higher margins and improved economies of scale. Growth is particularly strong in data services outside the U.S., he

noted.

Computer systems margins should improve, he said, because the new Cyber 170 line of standard systems requires less special technical effort than its predecessors and because of inherently greater performance-cost ratios. Shipments are slated to begin in June.

# Executive Corner

## Zasloff Resigns CA

IRVINE, Calif. — Sol Zasloff, Computer Automation, Inc.'s (CA) vice-president of marketing, has resigned to accept a similar post with Qume Corp.

His duties and responsibilities will be reapportioned among four present CA executives, said President David H. Methvin.

## Burroughs Appoints Several

DETROIT — Burroughs Corp. made new appointments. Dennis W. Kosinski is product manager of large systems; and Robert H. Davey, director of manufacturing planning.

Joel J. Knight is director of small and medium systems; Ronald G. Balding, director of B700 systems; and Robert S. Scheidmantel Jr. is director of peripheral products.

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Several factors contributed to the improved results, including Telex Computer Products Group's greatly diminished loss, profitable European operations and income from Telex Communications, Inc.

Revenues rose to \$106.1 million compared with \$89.7 million the previous year.

Telex Communications' income before taxes totaled \$2.8 million compared with \$3.1 million last year on increased revenues of \$26.7 million compared with \$24.7 million.

Telex Computer Products Group's revenues rose to \$79.4 million compared with \$65.1 million last year while its pretax losses were cut to \$1.3 million

compared with \$35.4 million in 1974.

The European operations of the group contributed \$4.7 million in after-tax income compared with a loss of \$4.4 million last year.

Peripheral lease income declined to \$22.4 million com-

pared with \$23.1 million last year, reflecting the effect of increasing equipment sales as opposed to the maintenance of a large lease base, the firm said.

Total company backlog at March 31 was \$16.5 million compared with \$24.5 million a year ago.

## Overseas Orders Prove HP Boon

### As Earnings Rise 21% in First Half

PALO ALTO, Calif. — Buoyed by a rate of orders stronger from overseas than the U.S., Hewlett-Packard Co. (HP) showed a 17% earnings increase in the second quarter and a 21% rise for the six months compared with similar periods last year.

Incoming orders for the firm were up 11% in both the quarter and six months, reaching \$250.4 million in the quarter and \$491.3 million in the half.

During the quarter, earnings reached nearly \$24 million or 87 cents a share compared with \$20.5 million or 76 cents a share in the same year-ago period.

Quarterly revenues rose 15% to \$248.4 million compared with \$216.4 million in the same 1974 period.

BURLINGTON, Mass. — First-quarter results were improved at Inforex, Inc. Earnings rose to \$116,000 or 4 cents a share compared with a loss of \$92,000 or 3 cents a share in the year-ago period.

Revenues rose 22% to \$13.1 million compared with \$10.8 million in the same 1974 period.

Orders for systems held steady compared with the first quarter of 1974.

Sales to third-party Leasing II contributed \$1.2 million in reve-

During the six months, earnings totaled \$42.4 million or \$1.54 a share compared with nearly \$35 million or \$1.30 a share in the year-ago period.

Revenues rose 14% to \$460.4 million compared with \$405.6 million in the first half of 1974.

"Our international business continues to show greater strength than our domestic business," commented William R. Hewlett, HP president.

"In the first six months of fiscal 1975, orders from international customers totaled \$251.3 million, a gain of 19% over the corresponding period in 1974.

"This compares with an increase of 4% in domestic orders to \$240 million," he said.

## First Quarter Positive at Inforex

nues. There were no such sales in the year-ago period.

Rental and service income rose to a quarterly record of nearly \$6.5 million compared with \$4.9 million last year.

President T.C. Cronin said earnings, revenues and orders were within the range of management expectations.

"We are watching closely the health of the economy and our customers' attitude toward capital spending, which are key factors behind the strength of our order stream," he said.

## Wyly Gets Financing Respite

(Continued from Page 29)

firm's ability to meet the \$10 million obligation and said the firm is having an investment banker explore the sale of Gulf.

At the end of 1974, Wyly sold Computer Leasing Co. to a Greyhound subsidiary, using the \$20 million in cash and notes to help reduce debt and fund Datran.

Wyly said its University Computing Co. subsidiary has agreed in principle to sell its Energy Group to Petroleum Information Corp. of Denver for \$4.7 million in cash. The firm termed this a separate development, unrelated to Datran's need for cash.

### Carrying Burden

In the chairman's message to stockholders, he said, "I emphasize that we did not found Datran in 1968 with the intention of carrying the financing burden ourselves, but it has worked out that way. We have progressed far, but without any certainty that we could generate the money needed to sustain Datran until it became self-supporting.

"Accordingly, 1975 is a year of severe test. Our ability to generate enough money will be tested. Datran's ability to sell its services will be tested."

Wyly's 1974 annual report received a qualified opinion from auditors Author Young & Co. because of uncertainties with respect to recovering investment in Datran and completion of the proposed financing.

### Other Reservations

Other reservations were voiced about a contingent liability to purchase up to \$30 million of Datran securities, the adequacy of a reserve for anticipated costs established in connection with a contract terminated during 1974 and the recoverability of certain assets and the ultimate outcome of a claim against Gulf Insurance Co.

The firm noted, in its eight pages of notes to its financial statements, that costs incurred by Datran have been capitalized or deferred until it ceases to be in the development stage or when it begins producing significant revenues.

The Financial Accounting Standards Board has issued a draft that would require firms in the development stage to present the same primary financial statements as an established operating company.

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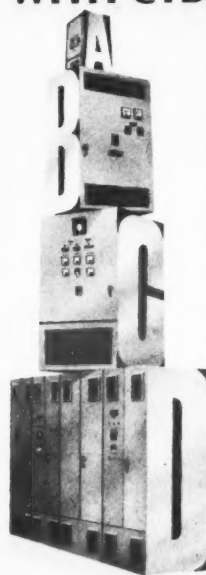
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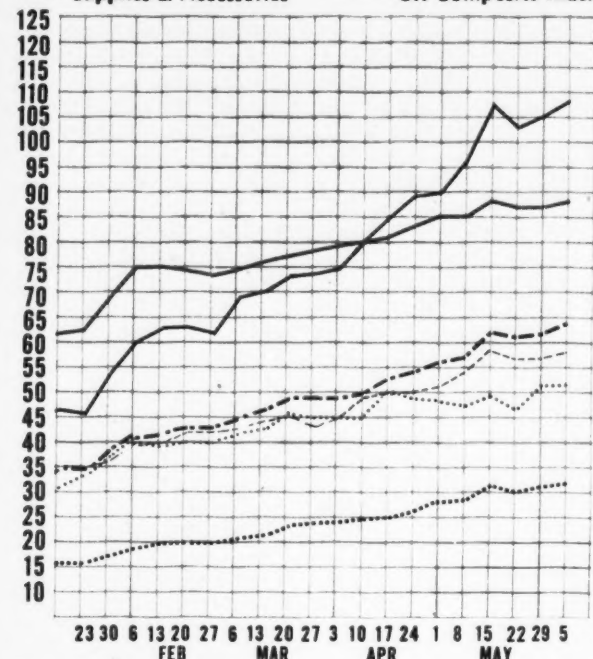
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Sales Offices

ELECTRONIC ASSISTANCE		
Year Ended Jan. 31		
	1975	a1974
Shr Ernd	\$ .47	\$ .34
Revenue	38,625,000	32,631,000
Disc Op	116,000	(21,000)
Tax Cred	349,000	182,000
Earnings	889,000	637,000



All statistics compiled,  
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		PRICE				
X		1975	CLOSE	WEEK	WEEK	
C		RANGE	JUN 4	NET	PC	
H		(1)	1975	CHNGE	CHNGE	
O	COMPUTER COMMUN.	1- 1	1 1/2	+ 1/8	+33.	
O	COMPUTER CONSOLES	3- 7	5 1/4	- 1/2	-8.	
A	COMPUTER EQUIPMENT	1- 2	1 1/2	+ 1/8	+9.	
O	COMPUTER MACHINERY	1- 2	1 5/8	+ 1/4	+18.	
O	COMPUTER TRANSCEIVER	1- 2	1 3/8	0	0.	
O	COMTEN	2- 5	4 1/4	+ 1/2	+13.	
N	CONRAC CORP	12- 20	18 1/2	+ 3/4	+4.	
O	DATA ACCESS SYSTEMS	1- 3	2 1/4	0	0.	
O	DATA LOG	5- 16	12 1/2	- 1 7/8	-13.	
O	DATA PRODUCTS CORP	1- 3	5 5/8	+ 1/8	+21.	
O	DATA TECHNOLOGY	2- 3	2	- 1/2	-20.	
O	DATUM INC	1- 2	1	+ 1/8	+14.	
O	DECISION DATA COMPUT	4- 7	5	- 1/8	-2.	
O	DELTA DATA SYSTEMS	1- 1	1 1/4	0	0.	
O	DI/AN CONTROLS	1- 1	1 3/8	0	0.	
N	ELECTRONIC M & M	1- 2	2 1/8	+ 1/8	+6.	
O	FABRI-TEK	1- 1	1 1/4	+ 1/8	+11.	
O	GENERAL COMPUTER SYS	1- 2	2 1/4	+ 1/4	+12.	
N	GELATINE CORP	3- 4	4 1/8	+ 7/8	+26.	
N	HARRIS CORP	18- 23	22 3/4	+ 1/4	+1.	
A	INCOTERM CORP	3- 8	7 1/2	+1 3/8	+22.	
O	INFODEX INC	2- 5	3 1/2	- 1/8	-3.	
O	INFORMATION INTL INC	8- 14	14	+2 3/4	+24.	
A	LUND ELECTRONICS	1- 1	2 7/8	0	0.	
O	MANAGEMENT ASSIST	1- 1	5/8	+ 1/8	+25.	
A	MILGO ELECTRONICS	8- 20	20	+2 1/4	+12.	
N	MOHAWK DATA SCI	1- 5	3 3/4	+ 1/2	+15.	
O	OPTICAL SCANNING	1- 3	3 1/4	+ 1/2	+18.	
O	PENRIL CORP	2- 2	1 7/8	0	-10.	
O	PERTEC CORP	2- 8	6 5/8	+ 5/8	+10.	
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.	
O	PRECISION INST.	1- 1	1 1/4	0	0.	
O	QUANTOR CORP	2- 5	4	+ 3/4	+23.	
O	RECOGNITION EQUIP	2- 6	5 3/4	+ 1/8	+2.	
N	SANDERS ASSOCIATES	3- 9	8 1/4	- 1/8	-1.	
O	SCAN DATA	1- 3	1 3/4	- 1/4	-12.	
O	STORAGE TECHNOLOGY	6- 15	14 7/8	+1 7/8	+14.	
O	SYCOR INC	5- 14	13 1/2	+1	+8.	
O	TALLY CORP.	1- 5	4	- 3/8	-8.	
O	TEC INC	1- 3	2 1/2	+ 1/4	+11.	
N	TEKTRONIX INC	18- 39	38 3/4	+2 5/8	+72.	
N	TELEX	1- 3	3	+ 7/8	+61.	
O	WANGCO INC	4- 7	6	- 1/8	-2.	
O	WILTEK INC	1- 4	3	0	0.	
	SUPPLIES & ACCESSORIES					
O	BALTIMORE BUS FORMS	4- 5	5 1/4	0	0.	
A	BARRY WRIGHT	5- 7	6	+ 1/8	+21.	
O	CYBERMATICS INC	1- 1	3/4	0	0.	
A	DATA DOCUMENTS	29- 42	34 3/4	- 3/4	-21.	
O	DUPLEX PRODUCTS INC	12- 25	21 1/8	+ 1/8	+0.	
N	ENNIS BUS. FORMS	5- 7	6 1/8	+ 1/8	+2.	
O	GRAHAM MAGNETICS	5- 9	8 1/4	+ 1/2	+6.	
O	GRAPHIC CONTROLS	8- 21	19 3/4	+ 1/4	+1.	
O	HEMP COMPANY	43- 68	67 5/8	+2 1/8	+3.	
O	MOORE CORP LTD	39- 48	48 1/4	-1 1/8	-5.	
N	NASHUA CORP	15- 22	19 1/4	+ 1/4	+2.	
O	REYNOLDS & REYNOLD	11- 24	17	+ 1/2	+3.	
O	STANDARD REGISTER	11- 18	16 3/4	+ 1/4	+1.	
O	TAB PRODUCTS CO	4- 8	6 1/2	- 1/4	-3.	
N	UARGO	17- 24	22 3/8	+1 3/4	+8.	
O	VANTER GRAPHICS CORP	4- 7	6	- 1/2	-7.	
A	WABASH MAGNETICS	3- 5	4 1/8	- 1/8	-2.	
N	WALLACE BUS FORMS	15- 25	24 1/2	+3	+13.	

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